Iowa E-Government Business Survey: Anticipating Demand and Understanding Financing Strategies

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Table of Contents

Acknowledgements

This study was requested by Information Technology Enterprise (ITE) of the Iowa Department of Administrative Services. ITE recognizes that it is important to have e-government market information on citizens and businesses when setting information technology priorities for the State of Iowa. ITE, Dr. Yu-Che Chen, and Dr. Kurt Thurmaier from the Public Policy and Administration Program at Iowa State University initiated the e-government service demand study and sought funding from the IOWAccess Advisory Council. The council approved the project and also formed a subcommittee to guide the study.

The project team would like to acknowledge John Gillispie, Chief Information Officer at ITE, for his inspiration and focus on creating value and services via information technology for Iowans. The IOWAccess Advisory Council's financial support is much appreciated. The council also provided guidance on the study. A subcommittee council consisting of David Redlawsk, Mary Maloney, and Mariam Ubben contributed invaluable input on the sampling and design of the survey.

The Center for Survey Statistics and Methodology (CSSM) served as the major project partner during the design and implementation of the survey. The team, led by Janice Larson, provided decades of combined experience in telephone surveys and in-depth knowledge of Iowa businesses and citizens. The center's Computer-aided Telephone Interview (CATI) system is state-of-the-art. The rigorous implementation of the quality assurance protocol ensured the accuracy and reliability of the survey responses.

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Executive Summary

This study is funded by the IOWAccess Advisory Council in collaboration with Information Technology Enterprise (ITE) of the Iowa Department of Administrative Services. The council formed a subcommittee to guide the development and implementation of electronic government surveys. Dr. Yu-Che Chen and Dr. Kurt Thurmaier of the Public Policy and Administration Program (PPAP, Department of Political Science, Iowa State University) are the lead researchers for the study. The Center for Survey Statistics and Methodology (CSSM) assisted with survey design and implementation. It also provided the Computer-Aided Telephone Interview (CATI) system.

This report is the first installment of a three-part series aimed at gauging the demand for Iowa electronic government services. It investigates various aspects of financing online services by examining financing schemes and payment methods. The report focuses on Iowa businesses and electronic services at the state level. The main sections of this report focus on Iowa businesses in the Internet age, conducting electronic transactions with the state government, and financing e-government services and payment methods.

The project team has exceeded the target of 400 surveys initially requested by the council. This sample of Iowa businesses composed of 432 respondents is representative of a cross-section of Iowa's 14,000-plus businesses, in terms of employment size and industry types.[1] The e-government survey subcommittee provided invaluable input on the sampling and survey design. The PPAP team and the survey center drew on their expertise and contributed quality and value to the design, implementation, and analysis of the survey. The results indicate that there is a significant opportunity for Iowa e-government services to reach out to the business community. Over 84% of Iowa businesses are currently online, with three-quarters using broadband connections. Among those online, only 30% currently conduct online transactions with the state government. Since most of the remaining 70% are interested in online transactions with the state, there is a significant opportunity for the state government to extend its services to a large portion of the business community.

To enhance responsiveness to business needs, the state government can focus its efforts on helping businesses navigate government websites while providing customized answers to service-related questions. Moreover, the state government can increase value by ensuring that information is updated frequently, and streamlining and automating the transaction process to boost speed and convenience. Certain functionalities can be added, such as online forms and e-mail confirmations.

In the business community there is no clear consensus on how to pay for e-government projects. One half prefers financing through tax dollars, and the other half favors user fees. However, when considering actual costs incurred in transactions with the government, companies agree on an average of $2 per transaction to pay for the convenience of online service. Iowa businesses place a premium on processing permits and accessing specialized business information online.

The state government will probably need to examine specific services in light of various public policy goals while it determines appropriate financing schemes. An additional charge for conducting online transactions may be kept at $2 or less to encourage wide participation. Priority should be given to the categories of e-government services that are in high demand and to the industry types that have expressed strong interests in such services.

[1] For results based on the sample, the margin of sampling errors is +/- 3 percent at 95 percent confidence level.

Introduction and Background

State governments around the country have been under tremendous pressures to do more with less. On the one hand, state governments have experienced budget shortfalls for the past few years. On the other hand, few state legislatures are willing to raise taxes to address state fiscal problems. Moreover, citizens and businesses still expect more and better services from state governments, and such expectations probably result from the belief that there is much room for improvement in state government operation. Facing pressures from citizens and businesses, state governments need to find better ways to improve their efficiency and effectiveness.

Information technology (IT) holds the key to doing more and performing better with less resources. At the minimum, IT helps state governments deliver up-to-date information on their web sites; accurate information helps citizens and businesses find the right agency office for the specific services they need, and it helps them stay informed of key dates. A major improvement can be seen: compared to paper-based processes that may take days or months, IT services require only minutes or hours. More advanced electronic government services would include putting entire transactions online, such as filing taxes or renewing driver licenses.[2] The savings in taxpayer dollars and time would be even more significant. Electronic government, or e-government, at its best can be an impetus for transforming government into a citizen-centric enterprise that fosters interdepartmental cooperation and collaboration to deliver to its citizens the best value for their tax dollars.

The state of Iowa, facing similar resource constraints as other state governments, is striving to leverage information technology to deliver better and more cost-efficient services to its citizens. The creation of Information Technology Enterprise (ITE) as an integral part of the state's Department of Administrative Services serves as a major initiative in using information technology to improve the business of government. The enterprise approach takes advantage of economies of scale in areas such as data centers, information security, and a state-wide e-mail system. The other state entity that takes an enterprise view of information technology is the IOWAccess Advisory Council. Its mandate is to promote electronic government by providing funding for initial investments in information technology projects.

In pursuing e-government, one of the biggest challenges is to remain citizen-centric.[3] Citizens here are broadly defined as those customers that state governments serve, including citizens, businesses, and nonprofit organizations that come in contact with state government in various capacities. Although governments at all levels recognize the importance of responsiveness, there is not enough effort directed at systematically understanding what citizens and business need from e-government. The last major comprehensive demand study was conducted in 1999 by the Momentum Research Group of Cunningham Communication.[4] In light of rapid developments in e-commerce and e-government, the findings in 1999 may not be relevant for information technology decisions in 2005.

The first step in becoming citizen-centric is understanding consumer needs. Market intelligence on the current and future demand for e-government services will help guide government

[2] For a scheme of the stages of e-government, see Karen Layne and Lee, Jungwoo, (2001), Developing Fully Functional E-Government: A Four Stage Model, *Government Information Quarterly* 18(2): 122-136.

[3] This argument has been advanced by General Accounting Office's (2001) report entitled "Electronic Government: Challenges Must Be Addressed with Effective Leadership and Management". State of Washington's Digital Government Plan has also emphasized the importance of being citizen-centric.

[4] For details, see Momentum Research Group of Cunningham Communication's (2000) report entitled "Benchmarking the eGovernment Revolution: Year 2000 Report on Citizen and Business Demand".

IT decisions. It will help governments deliver the most value to citizens and businesses given limited resources. For example, if citizens are keen on getting campground reservations online, government will be able to give priority to such a project. If businesses want the convenience of single sign-on (SSO) or government charge accounts, government should be able to respond to such demands and preferences.

In e-government needs assessment, the most important element involves studying how sensitive customers are to various costs and payment methods associated with online transactions. Payment methods impact both the adoption and financing of e-government services. For example, if a state legislature prohibits state agencies from absorbing credit card company fees into their cost structures, this effectively prevents agencies from offering credit card payment as an option. This then would discourage citizens and businesses who prefer credit card payment.

Information Technology Enterprise (ITE) recognizes that it is important to have e-government market information on citizens and businesses when setting information technology priorities for the State of Iowa. ITE initiated the e-government service demand study and sought funding from the IOWAccess Advisory Council. The council approved the project and also formed a subcommittee to guide the study.

The objectives of the study are two-fold. First, the study aims to understand the current and future demand for electronic government services. Second, it examines how much customers are willing to pay for online options and which payment methods they prefer. Citizens and businesses constitute the two main customer groups for electronic government services; since they differ so greatly from each other, this study examines each group separately to arrive at a more accurate assessment. The first survey focuses on businesses and shall be the subject of this report. The second survey focuses on citizens and shall be the subject of the second report.

The principal investigators of this project are Dr. Yu-Che Chen and Dr. Kurt Thurmaier, both faculty members in the Public Policy and Administration Program (PPAP) at Iowa State University. PPAP was chosen because of its expertise in e-government. PPAP is partnering with Iowa State University's Center for Survey Statistics and Methodology for the use of computer-assisted telephone interview services. The center also provides valuable survey experience and knowledge of Iowa citizens and businesses.

The subcommittee on e-government survey was formed by the IOWAccess Advisory Council and the subcommittee is serving as a strategic partner. The subcommittee is contributing invaluable insights on the scope and direction of the project. Subcommittee members are David Redlawsk (Professor, University of Iowa), Mary Maloney (Treasurer, Polk County), and Mariam Ubben (President, Software and Information Technology of Iowa).

The central goal of the project is to understand what Iowa citizens and businesses want in current and future electronic government services. To that end, a telephone survey is the preferred method, as opposed to a web-based survey. The telephone survey does not discriminate against those who may not be currently online but who still have opinions about future demand. The advisory council wanted a survey count of 400 firms and 400 citizens.

The current report is focused on Iowa businesses. In 2004, there were approximately 149,000 businesses in the State of Iowa, based on the DirectoriesUSA's comprehensive database on businesses in the State of Iowa.[5] Working with the subcommittee, the research team generated a stratified sample that is representative in terms of industry types (Standard Industry Code, SIC) and employment size (number of employees). This research sample allows us to determine whether

[5] For details, see methodology section, Appendix A.

large and small companies differ in their demand for e-government services. Moreover, the sample will help us determine whether differences in business or industry type are significant.

The survey began in August 2004 and ended in April 2005. The project began with a literature review of research on e-government, with a focus on e-commerce functions and payment options. We also reviewed state government websites, hoping to arrive at a list of realistic electronic government services that can be listed in the survey. Intensive survey development began in mid-September. During the process, the subcommittee provided guidance on the direction as well as the content of the business survey. After final programming, the Survey center launched the survey in mid-November. Considering the holiday season, the survey was extended into the first two weeks of January with the approval of the subcommittee. The final data set of useable responses was delivered to the researchers in mid-February. Data analysis and report writing spanned from March to April 2005.

The following section looks at Iowa businesses in the Internet age, examining the general makeup of Iowa businesses in terms of industry types and employment size. More importantly, it will examine the percentage of businesses online and analyze what kinds of internet connections they have. The third section examines the online transactions that Iowa businesses are conducting with the State of Iowa. We begin by identifying the benefits and barriers associated with online transactions, then we look at what kinds of transactions businesses want to conduct with the state, ranking them accordingly. The fourth section moves to finance-related questions, focusing on the issue of who should pay for online transactions and at what cost. We probe what preferences Iowa businesses have concerning payment methods. This report concludes with some recommendations on understanding and meeting the needs of Iowa businesses now and into the future.

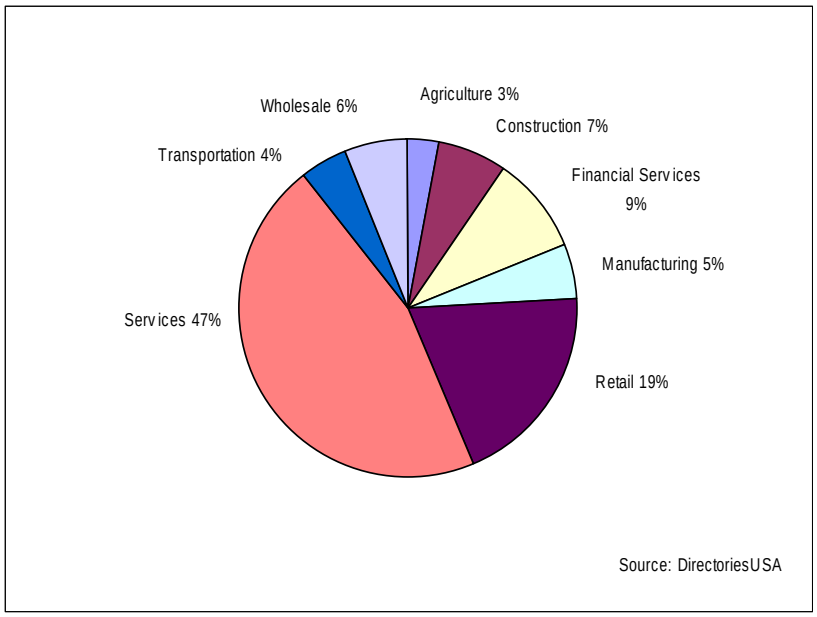
Iowa Businesses in the Internet Age

Iowa Businesses: Industry Type and Employment Size

There are 149,000 businesses in the State of Iowa, based on the comprehensive directory compiled by DirectoriesUSA (2004-2005 edition). According to DirectoriesUSA, this statistic has guaranteed completeness in so far as information from multiple sources were combined. The primary source came from Yellow Page telephone directories. Secondary sources include business white pages, annual reports, and SEC information. Also, a telephone call was made to each business for verification.[6] It should be noted that here the term "business" has been broadly defined to include nonprofit organizations such as schools and church groups. The rationale is to include a variety of organizations that may want to conduct online transactions with the state government.

The service industry is the leading industry group with the greatest number of businesses (Figure 1). This industry constitutes almost half (47%) of the total number of businesses. Retail trade ranks next, with 19%. Financial service businesses form the third largest group with 9 %. Construction, wholesale, and manufacturing have similar representation, at 7%, 6%, and 5 % respectively. Transportation (4%) is the industry group with the second to the least number of businesses. Agriculture represents 3% of the total number of businesses, and has the smallest number of businesses compared to other groups. Its position as the smallest group probably results from economies of scale. For example, in Iowa larger farms outnumber smaller ones.

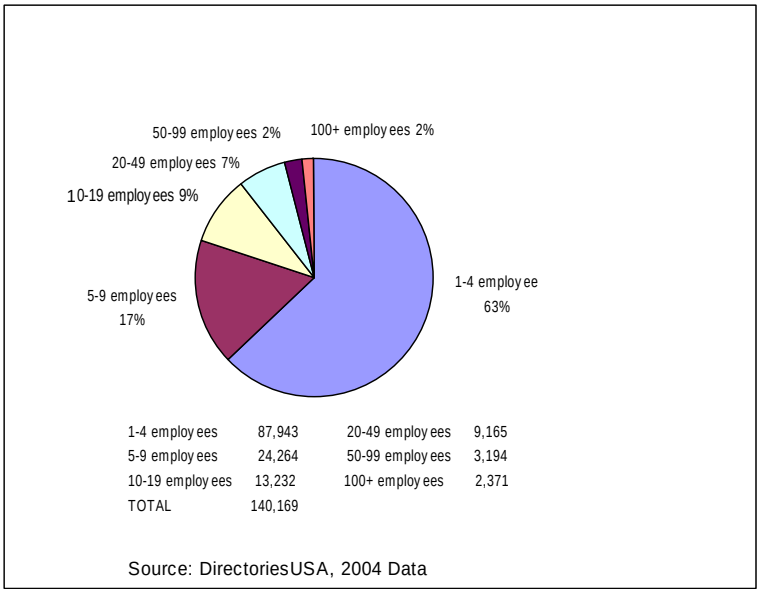
Figure 1. Business Counts by SIC Category



Most businesses in Iowa are small in terms of number of employees (Figure 2). Sixty-three percent of businesses have one to four employees. About 80% of businesses employ ten or less persons, 9 % employ ten to nineteen persons, and 7% employ twenty to forty-nine persons. Only 4% of businesses employ fifty or more persons.

[6] For details, see DirectoriesUSA, (2004), *Iowa Business Directory*, 2004-05 Edition, DirectoriesUSA, Omaha, NE.

Figure 2. Business Counts by Employment Size



Out of eight industry types identified, wholesale, retail and service businesses are the only three that have seen changes over the six-year period, 1999-2004. Moreover, business count by employee size has remained stable over the past six years. For example, the 1-4 employment-size group has remained at 63% of total businesses. The numbers are stable for all other employment-size categories. Assuming no major shift in Iowa's economy, the results of the survey analysis, with regard to employment size and industry types, will probably remain relevant for some years into the future.

A Representative Sample of Iowa Businesses

The representative stratified sample of 432 Iowa businesses covers the spectrum of industry types and employment sizes. Thus, the sample will give us a high level of confidence when we generalize findings over the entire population. The businesses that participated in the survey are representative in both dimensions. As shown in Table 1 below, the sample of Iowa businesses is almost an exact match of the Iowa businesses by SIC category. The only two differences are the services and retail sectors, where approximately a 1% difference can be noted for each.

Table 1. A Comparison of Iowa Business Population and Sample by SIC

Iowa Businesses By SIC Category		**Sample Iowa Businesses By SIC Category**	
47%	Services	46.1% (199)	Services
19%	Retail	20.1% (87)	Retail
9%	Financial Services	9.3% (40)	Financial Services
7%	Construction	6.3% (27)	Manufacturing
6%	Wholesale	6.3% (27)	Wholesale
5%	Manufacturing	4.6% (20)	Construction
4%	Transportation	4.4% (19)	Transportation
3%	Agriculture	3.0% (13)	Agriculture
(Source: DirectoriesUSA)		(Source: E-Government Business Survey)	

A breakdown of the sample by employment size also reflects the general business population (using employment size data from DirectoriesUSA, see Table 2). A breakdown of the employment-size groups in the sample results in a series of percentage ratios which is closely mirrored by a corresponding breakdown of the employment-size groups in the general population of businesses. That is to say, in terms of the variable "employment size," the sample and the actual business population have nearly identical ratio spreads. For example, the 5-9 employment-size group in the sample is only about 3 percentage points higher than the same employment-size group in the general population (17%). The largest discrepancy between the sample breakdown and the general business population breakdown is in the 1-4 employment-size group. Perhaps time or resource constraints made small businesses more reluctant to participate in the study. Nevertheless, the discrepancy is rather minimal, overall. The sample under-represents the 1-9 employment-size group by only about 3% points (76.8% versus 80%).

Table 2. A Comparison of Iowa Business Population and Sample by Employment Size

Iowa Businesses by Employment Size		**Sample Iowa Businesses by Employment Size**[7]	
80%	1-9 employees	76.8% (332)	1-9 employees
9%	10-19 employees	12.5% (54)	10-19 employees
7%	20-49 employees	6.3% (27)	20-49 employees
2%	50-99 employees	1.9% (8)	50-99 employees
2%	100+ employees	2.6% (11)	100+ employees
(Source: DirectoriesUSA)		(Source: E-Government Business Survey)	

Iowa Business Online: Status and Challenges

Internet Penetration Rate

The current penetration rate of internet use for Iowa businesses is 84.5% (Figure 3). This number is likely to reach the 90% mark within a year (January 2006) since another 4% of the participating businesses have indicated plans to get online (Figure 4). The use of the internet by Iowa businesses, however, is not uniform across industry types and employment-size groups. The following analyses focuses on industry type and employment-size.

[7] In the research data there are instances where reported employment size differs from the data recorded in DirectoriesUSA. These discrepancies can be attributed to the different definitions used by the survey and those used by DirectoriesUSA. DirectoriesUSA defines employment size by business location. In contrast, for this survey, researchers requested for information on the total number of employees for all locations in the state of Iowa, even if all online transactions are conducted from a central office. The rationale is to pinpoint the office that actually does the transaction and the number of workforce covered by that office. For example, the business “Kum and Go” in a specific location will register five employees but the final employment size may be in the hundreds when all locations in the state are included. As a result, some businesses were moved from the 1-employment-size group to another group. This new employee-size group assignment serves as the basis for all the analyses incorporating the variable “employment-size” in this report.

Figure 3. Internet Penetration Rate of Iowa Businesses

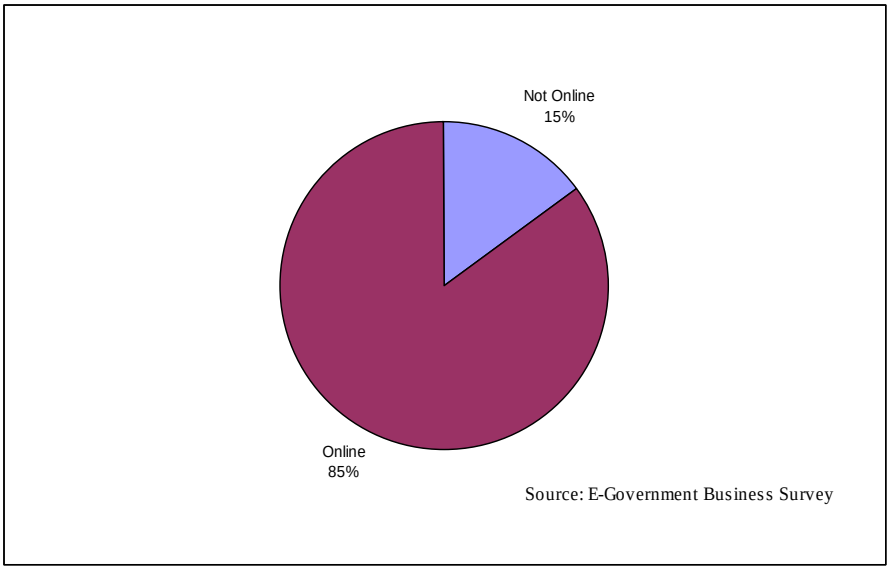
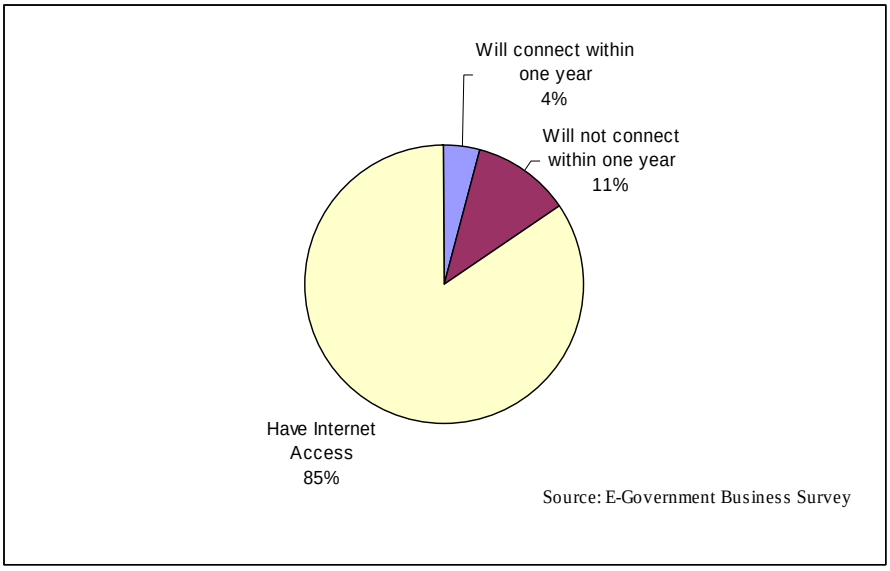


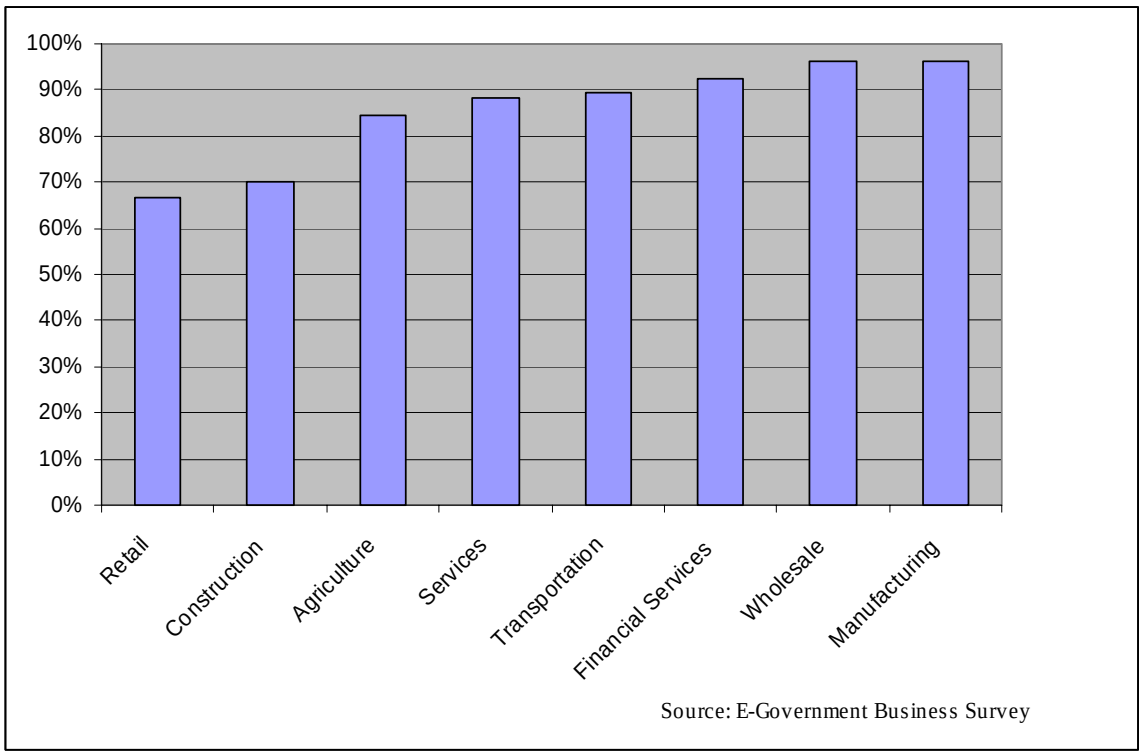
Figure 4. Expected Internet Penetration Rate within One Year



Both manufacturing and wholesale lead the way in internet use with a 96% penetration rate (Figure 5). The financial service industry is close behind with a 93% penetration rate. Transportation, services, and agriculture are in the range of 85-89%. Construction and retail lag behind, with 70% and 67%, respectively. These figures appear consistent with the general perceptions of how different industries use the internet. For example, manufacturing and wholesale establishments need to connect to the Internet to access electronic ordering or supply chain management systems as a part of doing businesses. Financial service is also heavily involved in

internet communication. On the other hand, construction companies, particularly smaller ones, generally are manual labor-intensive, often relying on paper or phone systems to handle transactions. Small retail shops with less than four employees are likely to follow the same pattern. It is worthy of note that the agricultural sector has a high penetration rate. This perhaps results from the use of high-tech equipment and processes in the agricultural businesses of Iowa.

Figure 5. Internet Penetration Rate by Industry Group (SIC)



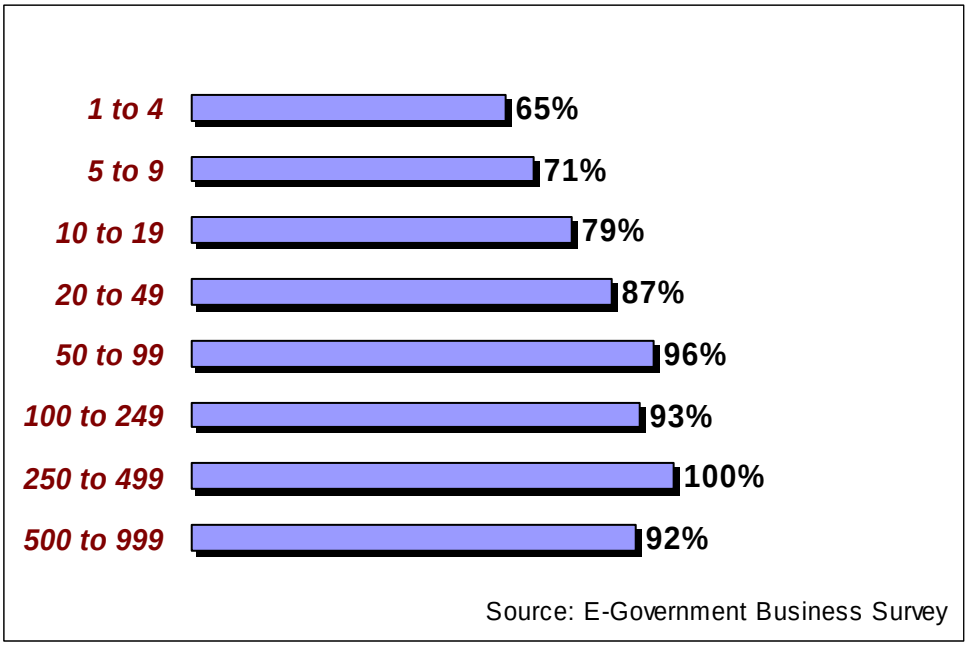
As expected, larger companies are more likely to be online than smaller companies; this discrepancy perhaps results from differences in economies of scale and capacity levels. For example, when the employment-size is greater than 50, the online penetration rate is 100%. The penetration rate decreases, however, as employment-size decreases. The penetration rate for the 5-9 employment-size group is 86%, while the penetration rate for the 1-4 employment-size group had an even lower rate of 72%. The only exception to this general trend is the slight decrease in penetration rates for employment- size groups 10-19 and 20-49. However, this decrease does not affect the significant trend exhibited overall.

High-Speed Penetration Rate

It is important to differentiate between the kinds of online connections used by businesses. High-speed connections enable businesses to conduct transactions with government more easily. These connections are used to avoid the hassle of dialing up as well as the long waiting times incurred when conducting online transactions. The survey makes a simple distinction between two types of connections: dial-up and high-speed. The discussion below focuses on businesses that access the internet using high-speed online connections. It is inferred that businesses that access the Internet without using high-speed connections use dial-up services.

Employment-size is positively correlated with the use of high speed (or broadband) access (Figure 6). For businesses of employment-size 1-4, only 65% have high-speed connection. For the 5-9 employment-size group, the percentage that uses high-speed connection increases to 71%. The percentages continue to rise, up to 79% and 87%, for the employment-size groups 10-19, and 20-49, respectively. For the employment-size group of 50 or more, the rate exceeds 90%. For the employment-size group of 250-499, the rate reaches 100%.

Figure 6. High-Speed Penetration Rates of Iowa Businesses by Employment Size



The percentages indicating high-speed access broken down by industry type correspond to the percentages indicating general internet usage broken down by industry type. However, within specific industry-types, there are differences between high-speed access and dial-up access. For example, the construction industry adopted high-speed access at a rate of 50% while its overall rate for internet use was 70%. Likewise, retail adopted high-speed access at a rate of 65% while its overall rate for internet use was 67%. In contrast, financial services businesses (86%) and wholesale businesses (86%) were leaders in the use of high speed connections.

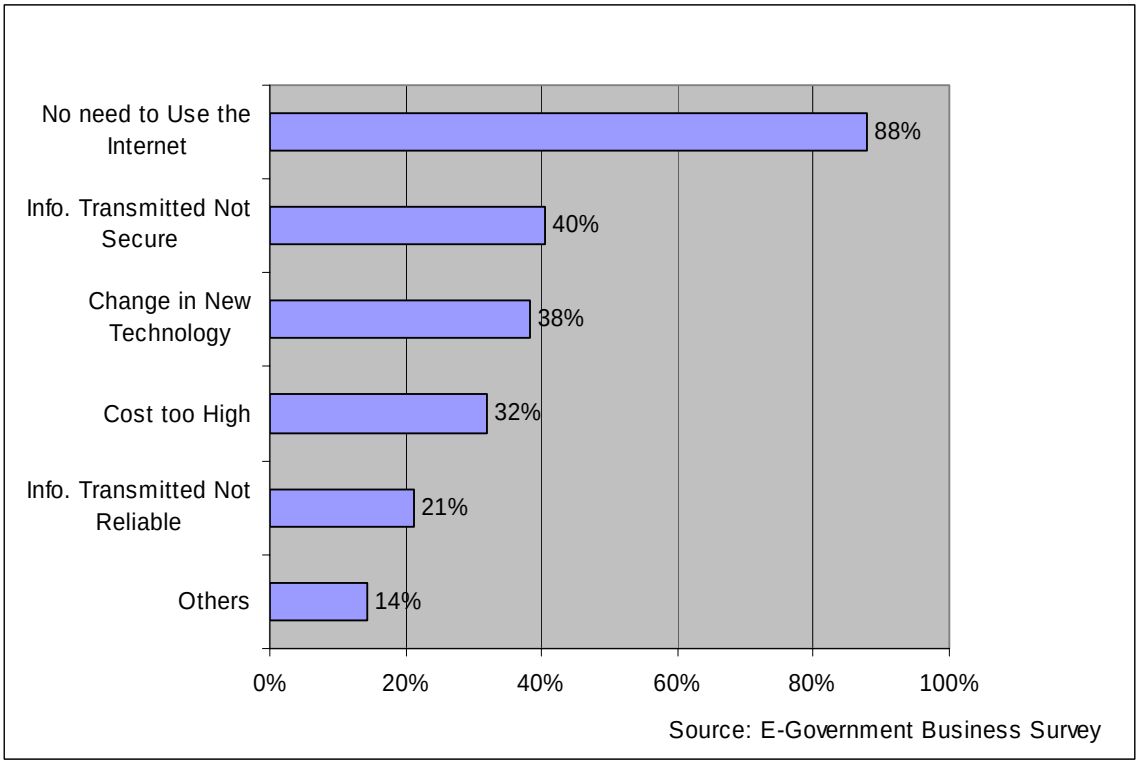
Moreover, we should note that for the transportation industry, high-speed access was adopted at a rate of only 69% while its overall rate for internet use was close to 90%. Similarly, the agricultural industry had a high-speed access adoption rate of only 64% while its overall rate for internet use was well above 80%. Perhaps for these two industries, while internet use is important, high-speed access is not imperative if most online transactions do not require high bandwidth.

Reasons for Staying Offline

Nearly 10% of Iowa businesses surveyed indicated that they do not plan to connect to the internet within a year. This statistic has policy implications for the state government, so it is important to understand why some Iowa businesses are choosing to stay offline. To businesses which have chosen to remain offline, we have specifically posed the question of why they have chosen to do so. Of the businesses that have chosen to remain offline, over 87% have indicated that

the primary reason is because they have “no need” (Figure 7). Concerns with security and keeping pace with changing technology presented only secondary reasons. Interestingly, cost does not appear to be a major reason for businesses to remain offline. Less than one out of three indicated cost as a problem, and less than one out of three felt that unreliable connections posed a significant reason to stay offline.

Figure 7. Reasons for Staying Offline (Percent Yes)



Conducting Electronic Transactions with the State of Iowa

A vast majority of Iowa businesses are currently online. However, it does not follow that conducting transactions electronically is their preferred way of doing business with the government. Businesses weigh the availability of electronic transactions against the convenience of various alternatives such as working with an intermediary, using the regular postal service, or making agency office visits. This section of the report begins with a profile of the types of transactions that Iowa businesses conduct with the state government. Next, it examines the cost benefit calculation of Iowa businesses when they choose an electronic method. With this as foundation, the use of electronic methods is assessed for intensity of use, satisfaction, and future demand.

Types of Business Transactions with the State Government

This report takes a customer-centric approach when examining the transactions that businesses conduct with the state government. Thus, Table 3 organizes transactions by types of services used, rather than by the particular departments of the state government charged with

providing those services. This classification is consistent with the customer-centric approach that information technology is able to realize for advanced e-government.

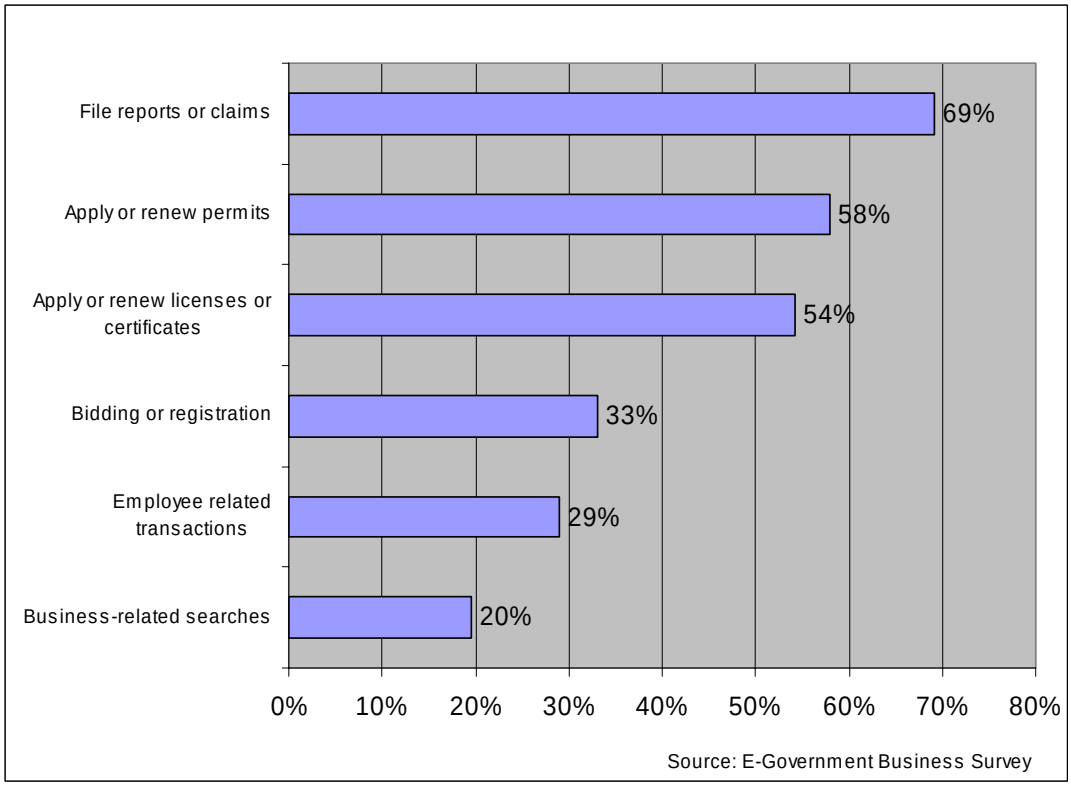
Paying taxes is the only universal activity that all Iowa businesses have in common. Other types of transactions are more specific to a firm's size, its industry type (SIC), and other factors. As seen in Figure 8, the most common transactions involve filing reports or claims. Sixty-nine percent of the sample indicate some experience with this type of transaction. Examples of this transaction type include making quarterly worker's compensation reports, providing industrial insurance quarterly reports, ordering corporate documents, filing workers comp claims, introducing legal filings, and submitting waivers. The second most common type of transaction involve applying for state permits. Fifty-eight percent of businesses have reported some experience with this type of transaction. Examples include applying for building permits, or requesting health, operational, electrical inspection, and overweight vehicle permits.

Table 3
Transaction Activities with the State of Iowa

Category	Examples
Pay Iowa business taxes	Income, sales, property, or other taxes.
File any reports or claims with the State	UCC filing, unemployment, or wage reports
Apply for or renew any state permits	Building permits, health permits, operating permits, operational permits, electrical inspection permit
Apply for or renew any professional licenses or certifications	Appraiser licenses, certification for agricultural products
Bid for state contracts, or register your company or its vehicles with the state	Register as a state contractor, submit bids for proposal, register commercial or fleet vehicles
Report, register, or search any employee-related information from the state	Employment registration, reporting new hires, records searches like criminal background
Conduct business-related searches from any state agencies, such as researching marketing information	Import/export information, obtain information from manufacturer's databases, economic partnership opportunities

Source: E-Government Business Survey

Figure 8. Types of Transactions Used by Iowa Businesses (Percent Yes)



Fifty-four percent of the sample report experience with applying for and renewing professional licenses. Examples include applying for appraiser licenses and nursing licenses, as well as requesting certificates for agricultural products (fruit, vegetable, grain, and seed). One-third of participating businesses have reported experience with bidding for state contracts or registering commercial fleets.

Twenty-nine percent of the sample report experience with conducting employee-related information searches, including the querying of employment registration, reporting of new hires, and researching into criminal backgrounds.

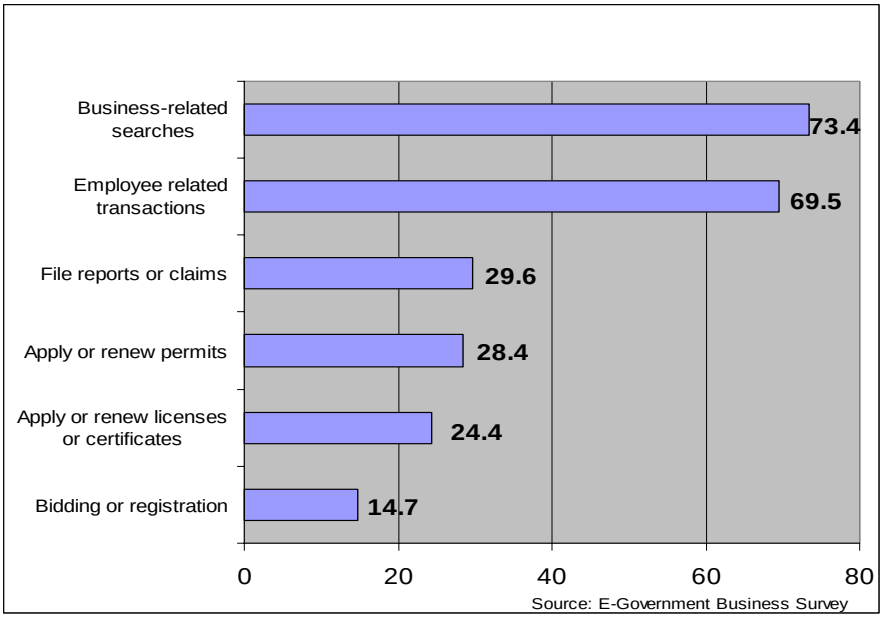
Twenty percent of the sample report experience with conducting business-related information searches, including collecting import/export data, querying manufacturer databases, and locating economic partnership opportunities.

Firms with more employees generally have more transactions with state government. This correlation remains consistent across various types of transactions; and this trend is expected intuitively, in light of the volume and complexity of transactions that large businesses conduct with the state government. For example, consider the filing of a report or claim. Fifty-two percent of small businesses in the 1-4 employment-size group have filed reports or claims with the state government. The statistic rises to 78% for businesses in the 5-9 employment-size group. The higher the number of employees, the higher the percentage of businesses in that size group. For example, 85.7% of businesses in the 100-249 employee-number group have filed a report or claim with the state government.

Online Transactions: Current Use and Satisfaction

For each type of transaction state government listed in Table 3 such as filing reports or claims, bidding, and apply for or renew any professional licenses, only about 30 percent, are currently conducting those transactions online (Figure 9). Only 29.6% of the sample are filing reports or claims with the state government online (e.g., UCC filings, wage reports, etc.). Similarly, only 28.4% of the sample businesses are requesting permits applications or renewals online. For license applications and renewals, only 24.4% of businesses are conducting these transactions online. The lowest percentage, 14.7%, represents businesses that are making bids for state contracts or registering company vehicles online.

Figure 9. Percent of Businesses Conducting Various Transactions Online



Thus, about 30% of the sample businesses are conducting these three types of transactions on line, and this general average is much lower than the general rate of business internet usage, which is at 84.7%. This discrepancy may be attributed to certain barriers, such as lack of channels for asking questions or lack of person-to-person communication. Yet, at the same time, this discrepancy indicates significant room for growth.

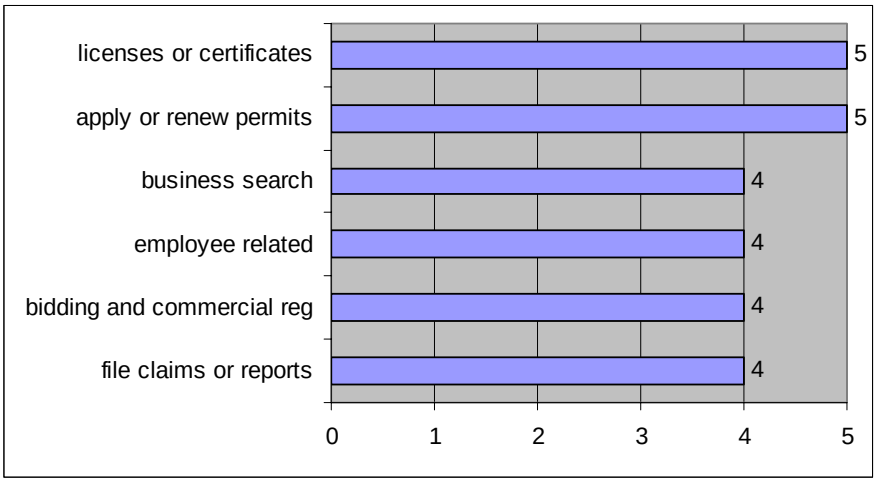
In terms of information research, about 70% of the sample businesses are participating online. For example, 69.5% of the sample are reporting, registering, or searching for employee-related information online. Business-related research, such as querying market information, represents the most popular form of online activity. Specifically, 73.4% of the sample businesses conduct this type of activity online.

Large employers are generally more likely to conduct online transactions than smaller ones. Businesses in the 1-4 employee-size group are less inclined to do business online. The share of firms (by size) conducting the most popular transaction of filing reports or claims online varies by 40 percentage points. Only about 20% of businesses in the 1-4 employee-size group conduct online transactions. For businesses of 500 or more employees, the rate increases to 67%. Although the general trend holds across the sample, there seems to be a tapering effect for businesses with over 500 employees. At this point, the percentage usually declines. For example, moving from the 250-

499 employee-size group to the 500 or more employee-size group, we see a decline of seven percentage points for the activity of applying and renewing professional licenses online. The same phenomenon is seen in bidding for state contracts online. One explanation for these phenomena may be found in the possibility that extremely large businesses have headquarters in other states outside of Iowa. Thus, certain transactions would be conducted with other state governments.

In general, Iowa businesses are quite satisfied with their online experiences (Figure 10). On a scale of 1-5 (1 meaning "very dissatisfied" and 5 meaning "very satisfied"), every type of transaction received a median rating of at least 4.0. Certain transactions received the highest ratings among all the types of transactions examined in this study, reaching a median score of 5. These transactions involved applying for permits (e.g. building, health, operations, etc.), licenses, and certificates. Report filing was also well-received, with a majority of the sample expressing satisfaction: that is, about one third of the sample said they were "very satisfied" with online report filing.

Figure 10. Median Satisfaction Scores for Online Services (1-5 Scale)[8]



Similarly, research of employee-related information and transactions was rated at a score of 4. The satisfaction score for bidding state contracts was slightly lower, perhaps reflecting the fact that the construction industry tends to spend less business time online. Conducting business research was rated as least satisfying, though it still had a median score of 4. The relative low enthusiasm for this type of research may stem from inherent difficulties in finding information on the internet that had been identified earlier as one of the main barriers against online government transactions.

[8] The median is a more appropriate measure of the satisfaction scores than the mean. The median is defined as the point where 50% of the values lie above the median and 50% of the values lie below. Hence, a median score of 5 would indicate that 50% of businesses are "very satisfied" with online services for processing licenses and certificates, and processing permit applications and renewals (where these services are available). In contrast, 50% of the businesses are merely "satisfied" (median=4) with online business-related information searches (where the service is available). We also use the median to report scores in Figure 13 (benefits of online transactions). The full descriptive statistics for both tables are reported in Appendix C.

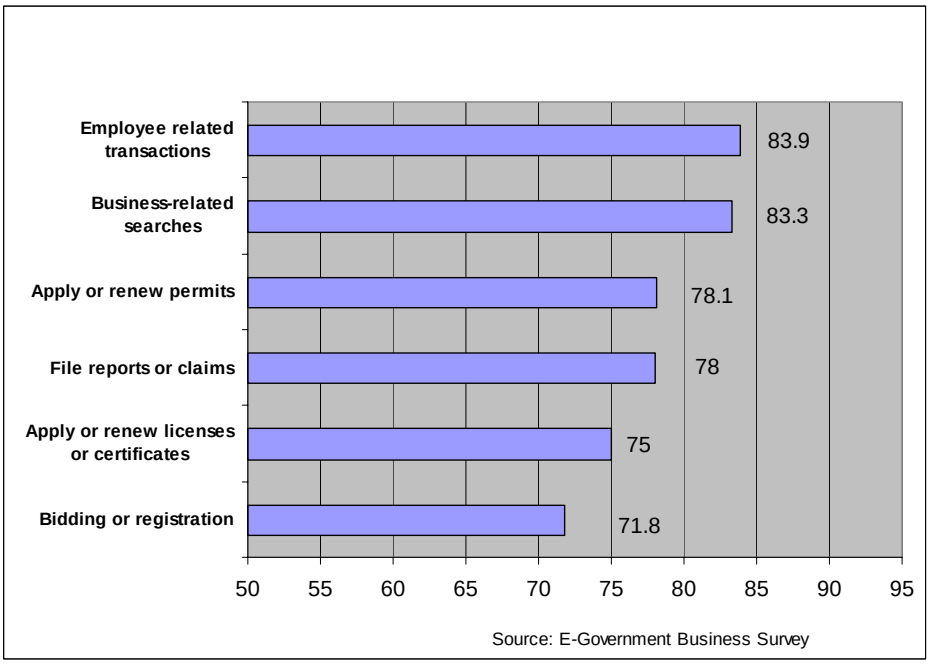
Future Demand for Online Services

Future demand for online services will be strong across various types of transactions, especially as a vast majority of businesses will want to conduct transactions with the government on line (Figure 11). Of those who are currently conducting no transactions with the state government online, on average, nearly 80% say they would like to do so in the future. Considering that only about 30% of businesses are currently conducting online transactions, both statistics taken together mean that there is a significant opportunity for future growth. More specifically, of those businesses filing reports, submitting claims, and making permit applications and renewals, 78% would like to conduct these transactions online. Closely behind this percentage, about three-quarters of Iowa businesses are willing to apply and request for renewal of licenses and certificates on line. Finally, 71.8% of businesses look forward to offering bids for state government contracts online.

Of all the online transactions examined in this study, employee-related information research and transaction, and business-related research, are proving to be in the most demand. Eighty-three percent of businesses would like to conduct this activity online in the future.

The percentage of businesses expressing interest in paying taxes online in the future is slightly lower than the percentage for all other future services. Approximately 70% of businesses not currently pay taxes online would like to adopt an online option in the future. The relatively heavier reliance on intermediaries for tax filing (40%) compared with the use of intermediaries in other transactions (30% or less) may help explain the relative lack of interest in filing taxes online.

Figure 11. Demand for Services Online in the Future (Percent Yes)



Variation in employee-size does not yield correlating differences in demand for future online services. A consistent trend across the different transaction types indicates that businesses in the 1-4 employee-size group are less likely to demand online transactions. It is possible that in general smaller businesses make considerable fewer transactions with the state government. Thus, smaller businesses would not associate benefits with online transactions in the same way that a large business would.

Similarly, in another consistent trend, businesses in the largest employee-size category of 500 or above tend not to demand as many online options as businesses in the medium employee-size group (50-499). It is possible that larger companies may have headquarters located outside Iowa, and benefits gained from more online options would not be as relevant if these companies deal mostly with the government of another state. Thus, in general, businesses in the larger employee-size group (100-499) do not necessarily demand more online options than businesses in the medium employee-size group (20-99).

The demand for online services seems to depend on the nature of the transactions. For example, contract bidding will be an online transaction in high demand for medium-size businesses but not for larger sized businesses. Perhaps larger contracts have different regulations for bidding. In contrast, larger businesses show a higher demand for submitting reports and claims online. There are no clear trends for the other transactions types, such as submitting applications for permits, applying for professional licensing, or requesting employee-related transactions.

In general, Iowa businesses show a strong demand for online services regardless of industry type. For example, an average of 67% of Iowa businesses across industries want to make tax payments online. The average percentage for contract bidding online is similar.

For the other online transaction types, we find an exception to the general rule. Agricultural businesses are least interested in online transactions. Agricultural businesses are 20% behind the general average in terms of demand for online transactions related to permits, professional licensing, and claims/reports filing. Nevertheless, the agricultural business sector constitutes a very small ratio in Iowa's business community (Table 1).

A more careful analysis of Figure 8 and Figure 11 reveals a paradox. There is a clear inverse relationship between the frequency with which firms conduct specific transactions with state agencies (Figure 8) and the frequency with which they conduct these transactions online (Figure 11). Thus, while 73% of business-related information searches are conducted online, this constitutes less than 18% of the transactions firms conduct with the state. Conversely, while 58% of firms apply for or renew permits with state agencies (Figure 11), less than 30% of these transactions are being conducted online (Figure 8). Similarly, among businesses applying for or renewing licenses or certifications, 54% conduct these transactions with state agencies, and less than 30% do so online. Of the 33% of businesses bidding for contracts with state agencies, less than 15% do so online. This means that 5% of businesses are using online bidding.

The paradox raises important issues for the IowAccess Council. This analysis suggests that funds should be targeted at increasing online services related to filing reports, claims, permits and licenses. Table 4 presents the distribution of unmet demand for online transactions by SIC group. The percentage indicates the proportion of transactions in a specific industry group (SIC) that are conducted in a traditional format instead of online; hence, the percentage indicates what proportion of that transaction type (e.g., file claims or reports)—by industry—that *could be developed* into an online format to meet the demand of a specific industry. For example, 100 percent of the firms in agriculture that indicate a desire to file claims online currently use a traditional paper method; in construction, 80 percent of the firms that indicate a desire to file claims online currently use a traditional paper method.

In general, the table suggests that the unmet demand for online transactions is least satisfied in the retail sector, and that the demand for online transactions is most satisfied in the wholesale sector. Still, the unmet demand for online transactions in the wholesale sector averages about 65 percent across all service types, even though the demand for online business-related searches is entirely met by state agencies.

Table 4. Unmet Demand for Online Transactions, by SIC and Service Type

Online Potential Demand to(for):	SIC Group: Agric	Const	Fincl Serv	Manfg	Retail	Serv	Transp	Whole sale	% Deficit of Type
File claims or reports	100%	80%	83%	76%	97%	80%	90%	73%	84%
Apply or renew permits	89%	100%	65%	71%	92%	71%	83%	93%	80%
Apply or renew licenses or certificates	88%	82%	72%	100%	92%	78%	75%	80%	81%
Bidding and commercial registrations	100%	90%	100%	86%	97%	80%	100%	81%	88%
Employee-related searches	33%	40%	44%	29%	58%	51%	29%	63%	48%
Business-related searches	67%	50%	45%	50%	64%	32%	75%	0%	43%

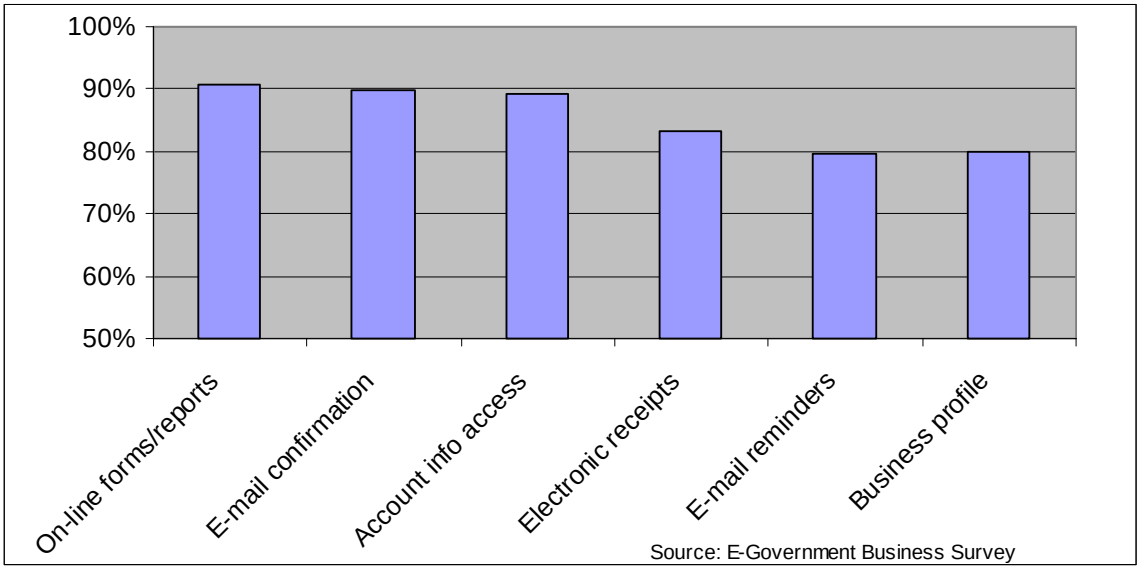
Source: Iowa e-government business survey

Table D1 in Appendix D provides more specific guidance for agencies concerning which types of transactions are appropriate for development, given the industry for which the agency has responsibility. In general, the IowAccess Council should give priority to agencies proposing to develop online transactions for which there is demand, taking into account the specific transaction type and industry type.

Enhancements of Online Services

There are several functionalities that can be introduced to online transactions: providing forms and reports for downloading, sending e-mail confirmations of transactions, providing online access to accounts, offering electronic receipts for transactions, sending e-mail reminders for deadlines, and allowing for updates of online business profiles. Iowa businesses were asked to name the enhancement(s) they would most want the state to provide The study has found high demand for these functionalities, with high percentages of businesses (80% to 90%) expressing interest in these supplements (Figure 12). Three specific functionalities are particularly in high demand, downloading forms and reports (91%), receiving e-mail confirmations of submittals (90%), and accessing business accounts on line (89%). Businesses are already taking advantage of such e-commerce functions on a regular basis when conducting transactions with other businesses in the private sector, namely, banks, suppliers, and etc. They should expect that state government would be able to offer similar services. The second group of online service enhancements includes receiving electronic payment receipts, receiving e-mail reminders of deadlines, and having the ability to update online business profiles. About 83% of Iowa businesses want electronic payment receipts, and 80% want the other two services.

Figure 12. Demand for Enhancements to Online Services for Businesses (Percent Yes)



Transactions with Government Using an Intermediary

For filing taxes, about 40% of businesses in Iowa are using intermediaries such as CPAs or law firms. In general, small businesses are more inclined to use an intermediary than large businesses. About 40% of businesses in the 50 or less employee-size group use an intermediary for filing business taxes, including income, sales, property, and other types of taxes. For businesses in the 50 or more employee-size group, the percentage which uses intermediaries decreases to about 30%. This trend reflects the fact that smaller businesses have less capacity for the paperwork involved in tax preparation. A larger business may have an independent department for dealing with tax issues. Among small businesses, those in the 5-9 employee-size group have a higher rate of intermediary usage than businesses in the 1-4 employee-size group. This trend probably reflects the fact that small businesses in the 1-4 employee-size group have less complicated and more straight-forward tax preparation responsibilities.

In terms of other transaction types, we also find variation in intensity of intermediary usage among Iowa's businesses (Table 5). For example, to file reports and claims in worker's comp cases and legal filings, one-third of Iowa businesses choose to work with an intermediary. For obtaining permits, only 13% of Iowa businesses choose to use an intermediary. Similarly, for transacting professional licensing and business-related research, only about 11% and 12%, respectively, of Iowa businesses would use an intermediary.

Compared to larger businesses, smaller ones rely more on intermediaries for filing reports or claims, a fact that may be attributed to lower in-house capacity. However, for other transaction types, no clear trend emerges. This is partly due to the small number of businesses in each employee-size category for each transaction type. Another possible cause may stem from the nature of each transaction and rules and regulations governing a particular industry type.

Table 5
Use of Intermediary by Transaction Type

Category	Percent
Pay Iowa business taxes	42
File any reports or claims with the State	36
Apply for or renew any state permits	13
Apply for or renew any professional licenses or certifications	11
Bid for state contracts, or register your company or its vehicles with the state	6
Report, register, or search any employee-related information from the state	18
Conduct business-related searches from any state agencies, such as researching marketing information	12

Source: E-Government Business Survey

Industry type in conjunction with transaction type seems to determine the use of intermediaries. In filing taxes, over 60% of agricultural and construction businesses use intermediaries. In contrast, about 30% of service and transportation businesses use intermediaries. In comparison, an average of 40% of businesses use an intermediary when dealing with tax-related transactions.

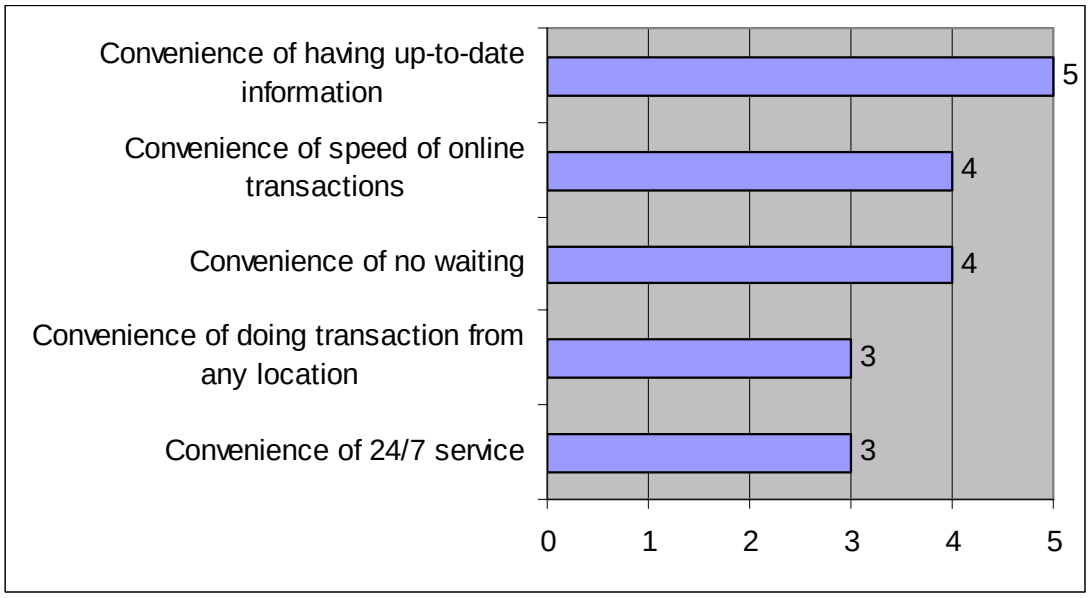
For reports and claims, a different profile of businesses which use intermediaries emerge. Close to 60% of retail businesses use an intermediary, a figure which is above the average of approximately 40%. In contrast, only 10% of the construction industry use an intermediary for similar transactions. Perhaps retail businesses have a limited grasp of the range of reports and claims relevant to them. Thus, it would be easier for them to utilize the services of intermediaries.

For professional licensing, transportation businesses are a heavy user of intermediaries (40%), compared to an average of 10% for all other industry types. No doubt, professional licensing is one of the principal transaction areas of transportation businesses. Perhaps transportation businesses work with professional associations to handle licensing needs. In this regard, construction businesses also tend to use intermediaries more often than other industry types.

General Attitude toward Benefits and Barriers

In general, Iowa businesses see several benefits of conducting business online with state government (Figure 13). They rank up-to-date information as the primary benefit of doing business online. The median score of importance is 5 on a scale of 1-5 (1 meaning “not important at all” and 5 meaning “very important”). Of the nearly 360 businesses responding to the question, 229 (63%) say that it is very important. The convenience of not having to wait and the speed of transactions follow closely behind as two important benefits. Participating businesses are rather ambivalent about the importance of 24/7 services and the ability to conduct transactions from any location.

Figure 13. Scores for Benefits of Transacting Online with State Government (Median)[9]



Different industry groups have different perceptions of the relative importance of a particular benefit. For example, having up-to-date information is very important for financial service businesses, with three-quarters of them indicating so. In contrast, up-to-date information is not a high priority for construction businesses; only one-third rank it as "very important".

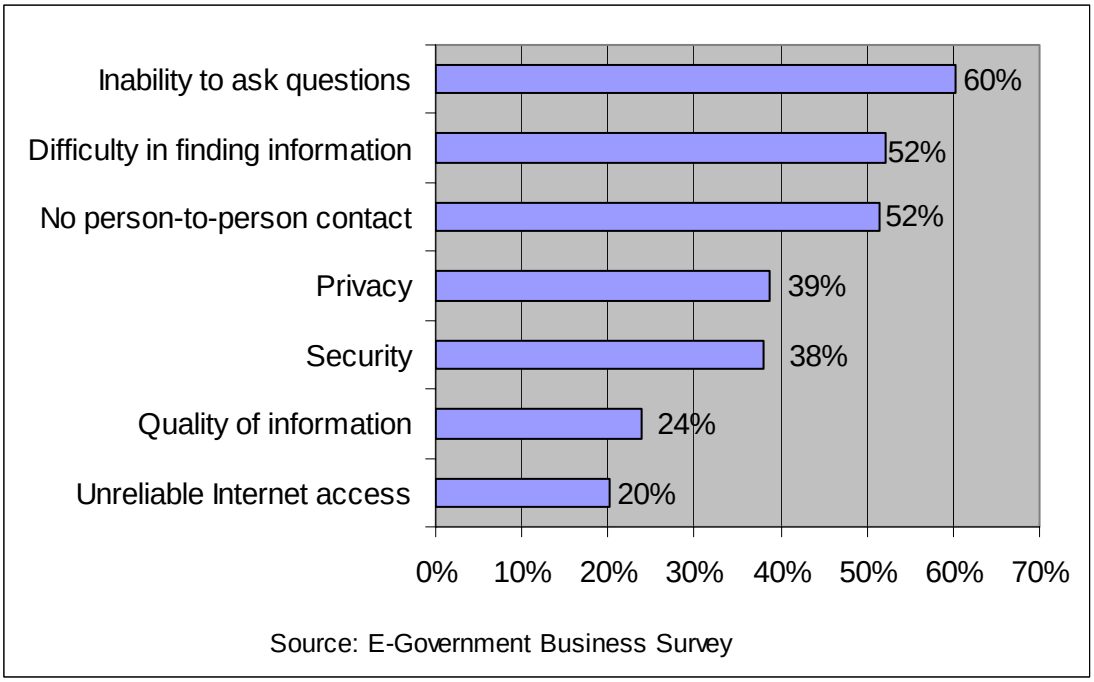
Another example is the importance of the convenience of not having to wait. It is a high priority for the retail industry, with the majority of them ranking it as "very important." Construction businesses, however, take a very different view; only one-fifth say it is "very important." Thus, observed differences in how businesses rank the importance of certain benefits probably stem from variations in the business operations of the different industry types

Financial service businesses are likely to put a premium on up-to-date information because it is a major source of value. Construction, on the other hand, works with rules and codes that are relatively stable and updated only periodically at specific time points. As a result, construction would not perceive any significant value in having the most update-to-date information.

Iowa businesses also face barriers when conducting government transactions online (Figure 14). These barriers represent opportunities for the government to enhance the online experience of businesses, and opportunities for boosting satisfaction levels. Sixty percent of businesses indicate that the number one obstacle to conducting government transaction online is the inability to ask questions. Similarly, nearly 50% of businesses report that difficulty in locating information and the lack of person-to-person communication are obstacles to online transactions. For most businesses, security and privacy do not pose as significant barriers. Only slightly more than one-third of businesses indicate that either security or privacy would be an obstacle. Moreover, only one-fifth of businesses believe that unreliable internet access and quality of information pose as obstacles.

[9] A complete set of descriptive statistics can be found in Appendix C, Table C2.

Figure 14. Barriers to Using Online Government Services (Percent Yes)



Industry groups differ when ranking their concerns about conducting transactions with the state government online. Again, such differences probably result from differences in the basic business of each industry type and the kinds of transactions needed by each industry type. Nevertheless, for the top-ranked concern (the inability to ask questions) a majority of the industry types are in agreement. Agricultural and construction businesses represent the two extreme points in the spectrum of opinions: 73% of agricultural businesses and 36% of construction businesses say that the inability to ask questions is a primary concern. A similar trend can be seen in perceptions of barriers to finding information online. While the majority of the industry types are in agreement, nevertheless, 70% of the transportation industry tends to see it as a significant problem and only 48% of the service industry and only 46% of the retail trade industry share this opinion.

Financing E-Government Services for Iowa Businesses

Developing online transactions capacity for state agencies is not without its cost. More importantly, there will be continuing costs involved in maintaining online transaction capacities. Thus, it is useful to have a pricing framework. Then, state agencies can determine their ability to recover development costs and their ability to provide a revenue stream for maintaining online transaction capacity. Not all transactions are amenable to cost recovery, and some transactions may generate higher fees than others.

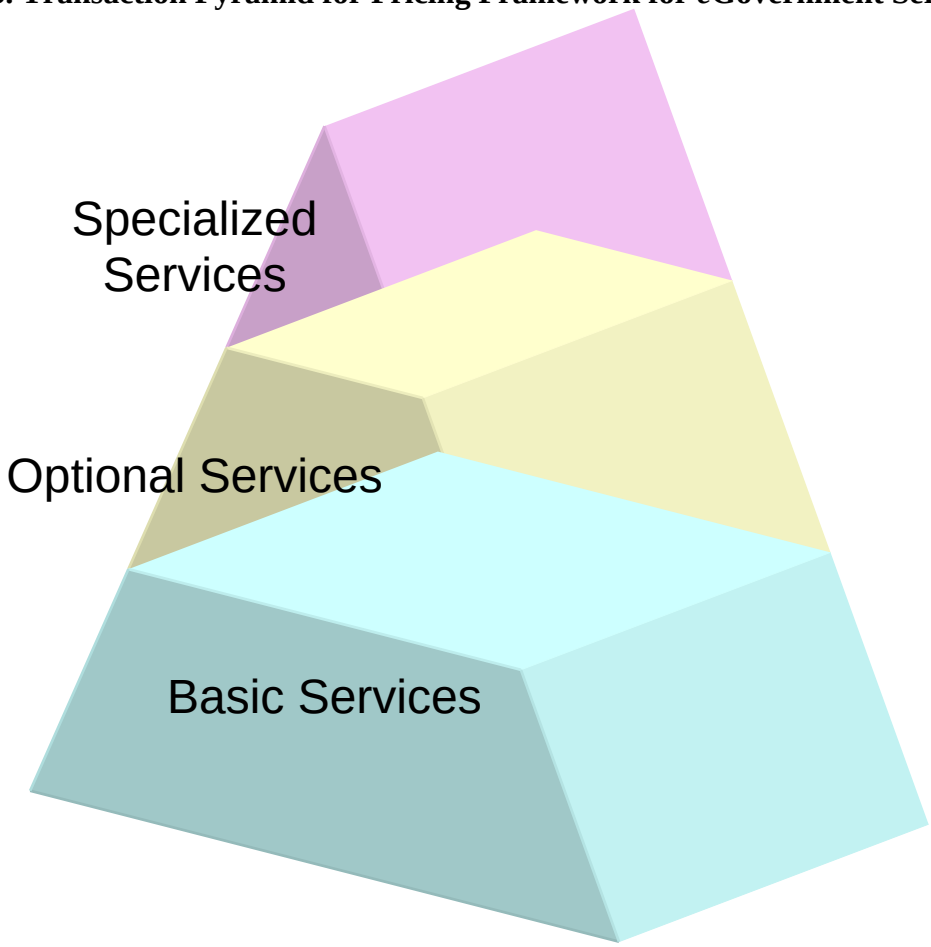
Figure 15 presents a framework for determining pricing structures for online transactions. There are three types of online services that a state agency can provide. The most basic service is that which only government can provide and that which all business, regardless of industry type, must utilize. Tax filing is a good example of such a service. All businesses must pay taxes, regardless of what industry they are in.

The second kind of services (optional) involves those which are required for specific business activities, and for which speed of transaction has financial consequences for the business. When a business needs to file a standard permit request to conduct a certain activity, the application may be posted through the mail or brought to the agency office. Both options accrue transaction costs beyond the normal requirements for completing the application. Posting by mail, for example, means several more days of delay before the application actually gets to the agency and processed. Even assuming the permit is not lost or misdirected in the mail, the delay in processing the permit may present opportunity costs for the firm. That is, the firm may lose the opportunity to provide service to one or more customers because it lacks the permit required to provide the service. The cost of the permit now includes the fee to the state agency plus the mailing expenses, plus the lost revenues stemming from opportunity costs. Alternatively, filing the permit application personally at the state agency would require that a staff member (or the business owner) travel to the agency office, perhaps thereby accruing parking expenses and travel expenses, and accruing other costs in salary and benefits, not to mention vehicle maintenance cost, and so on.

On the other hand, filing the permit application online through the agency's website would dramatically reduce the time between completing the application and filing it with the agency, while eliminating travel and salary expenses. A business can examine the situation from an economic perspective, comparing the relative cost of filing the permit online, filing in person, or filing by mail. Thus, if a business has information that indicates an online filing would receive faster processing, and it has a choice between faster and slower processing, that business should be willing to pay a fee less than or equal to the transaction costs incurred with other options, all other factors being equal. In this case, the online transaction fee would be considered a convenience fee, that is, an expense that the business would be willing to pay to expedite transactions and reduce total transaction costs and opportunity costs.

The third kind of services (specialized) encompasses those transactions that a state agency can provide which can be compared to a private good, that is, when a particular service is provided to one firm, it can not at the same time provide the same service to another firm. Moreover, unless the business (as a customer) is willing to pay for the service, the agency is under no obligation to provide it. The agency may have authority to provide the service, but it is under no mandate to do so. A good example of this type of service would be a customized search of a database that requires special programming and hence extraordinary staff time. An agency staff would have to compile the search and provide to the firm the requested customized dataset.

Figure 15. Transaction Pyramid for Pricing Framework for *e*Government Services



The most important point of this transaction pyramid is that it suggests a corresponding tiered pricing structure. Below, the examples provided to explain this pyramid are not exhaustive. Rather, they are merely presented as representative samples of each service type.

At the “basic services” tier there is little justification for charging a firm additional fees for a transaction. If a business is already paying taxes, requiring a fee for a compulsory payment would be inappropriate. Moreover, basic services that resemble pure public goods should generally be paid through general tax dollars, not transaction surcharges.

On the other hand, transactions in the “optional” (convenience) tier are very amenable to fee charges. The cost of convenience would be paid by a business when it decides a lesser expense is better than or equal to expenses incurred through other transaction methods (such as visiting the agency on-site, or transacting by mail).

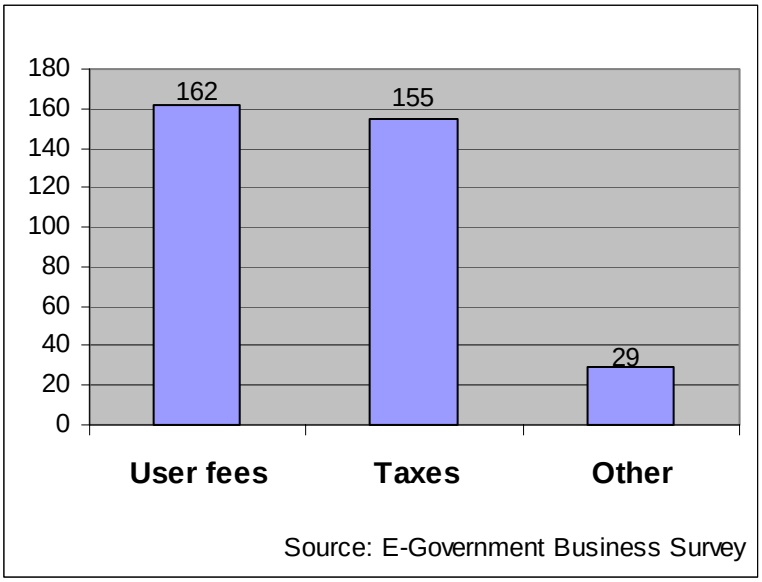
Finally, transactions in the ”specialized” tier can command higher charges since those services are specific to a business’s particular requests and such unique requests for services amount to a commodity for which the business is willing to pay. The pricing of such services is limited only by the value of the commodity to the business. Nevertheless, the pricing can be fixed at a minimum to reflect the extra costs of providing the customized service.

Below we examine the basic attitudes of businesses regarding the appropriateness of using fees or paying taxes to recover development costs, and their willingness to pay fees—and how much—for certain types of online transactions with state agencies.

Opinions on User Fees for E-Government Business Services

Iowa businesses are split in terms of who should pay for the development costs of e-government services (Figure 16). When surveyed, businesses were reminded of the cost of developing e-government services. The businesses were presented with two options: (a) use tax dollars to pay for the development costs, and (b) charge user fees to recover the development costs. Out of 317 responses, 47% of businesses (162 total) prefer user fees while 45% (155 total) prefer using tax dollars. The remaining 8% of businesses (29 total) indicate that they would prefer different options.

Figure 16. Business Preferences for Financing of E-Government Services

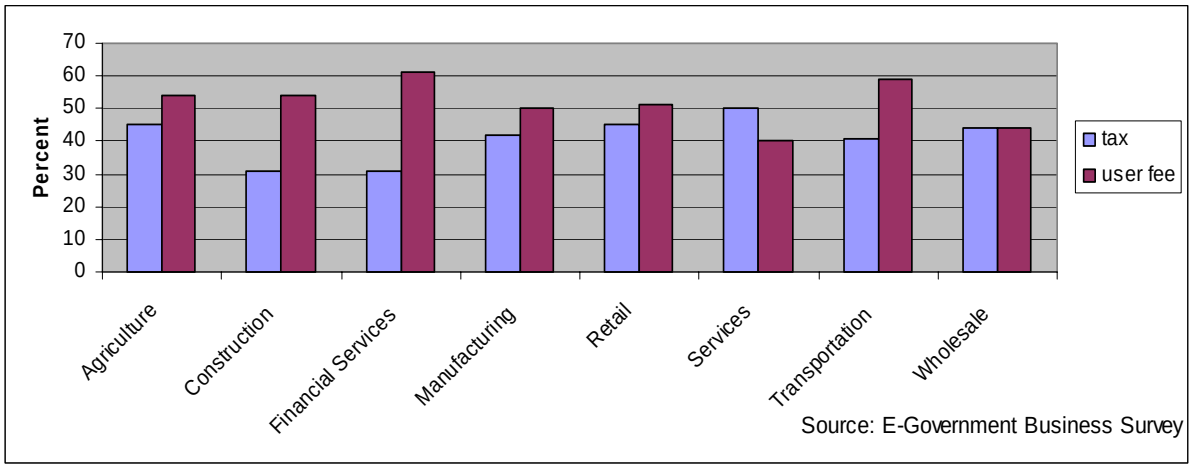


The opinions on whether e-government services should be financed by tax dollars or user fees vary by industry type (Figure 17). Only the retail industry shows a clear preference for financing through tax dollars. Wholesale is rather ambivalent. All the other six industry-types show a clear preference for user fees. Among these six industry types, financial service businesses are most comfortable with user fees. Though more industry-types prefer user fees, the actual number of businesses is small and, clearly, retail businesses dominate the business community. This explains how the total number of businesses which prefer user fees is only slightly higher than the number of businesses which prefer tax financing. Financial service businesses and construction businesses are probably more familiar with paying user fees for specific transactions. Retails companies may not be used to the idea.

Employment-size does not entail a clear relationship with the opinion on whether to finance e-government services with tax dollars or user fees. One might expect that small companies would prefer tax financing and large companies would prefer user fee financing, considering the differences in financial resources among the different size businesses. However, no such pattern exists. The results are rather mixed. Companies that have more than fifty employees prefer paying

taxes; with the exception of really large companies (500 or more). Companies with less than fifty employees are divided in their opinions. Most are ambivalent about the preferred financing method. The exception to this trend is that companies with only 1-4 employees seem to prefer user fee financing.

Figure 17. Preferences for Financing of E-Government Services by Industry Type



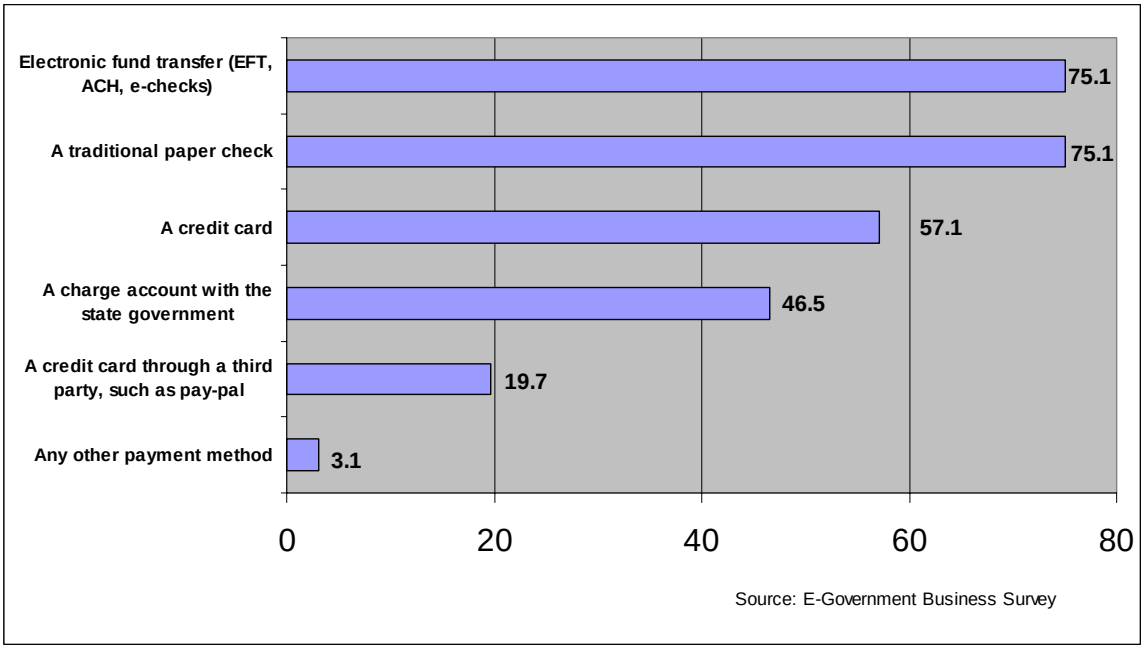
Iowa businesses express a consistent view on charging user fees. To gauge how sensitive businesses are to user fees, they were asked whether a nominal user fee would discourage them from using online services. Slightly more than half (52.9%) indicate that a nominal fee would discourage them from online transactions. Of this 52.9%, two-thirds say that the user fee "probably would discourage" them, whereas one-third took a stronger position, saying a user fee would "definitely discourage" them. On the other hand, slightly less than half (47.1%) of the businesses say that they would not be discouraged by a nominal user fee. Among those who would not be discouraged by a nominal user fee, four-fifths say that they "probably" would not be discouraged. The remaining one-fifth indicate that they "definitely" would not be discouraged.

General Preferences Regarding Payment Methods and Surcharges

Three-quarter of Iowa businesses would like to have electronic fund transfer (e.g., EFT, ACH, or e-checks)[10] and traditional paper check options to pay for online transactions (Figure 18). As for payment by credit-card, 57% of businesses say that they would want this option made available. A charge account with the state government is another idea that receives a fair amount of support. About 46% of businesses see it as a desirable payment option. Using a credit card through a third party, such as Pay-Pal®, received the least amount of interest. Less than one-fifth of the businesses indicate interest in this option. The sum of the percentage distribution below is greater than one hundred. This is because businesses were able to choose multiple payment methods.

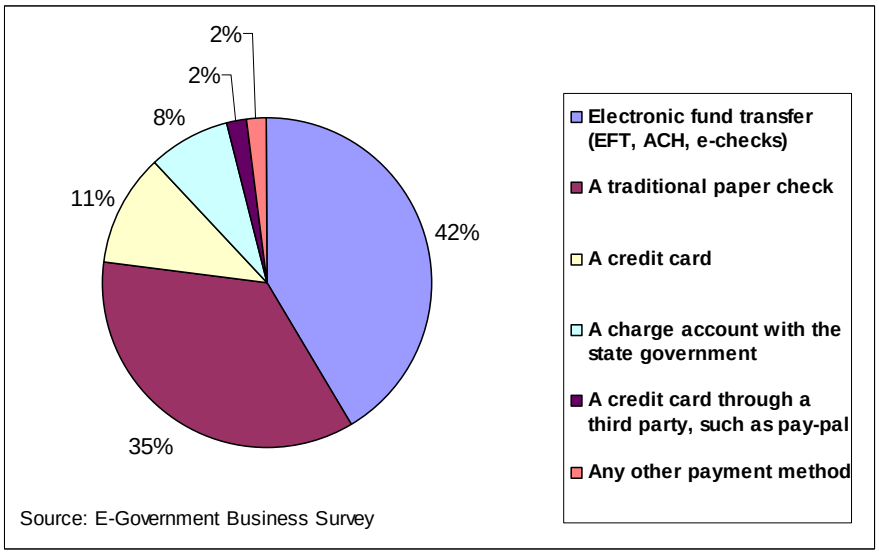
[10] EFT refers to "electronic fund transfer." ACH refers to the "Automated Clearing House" network, which is a nationwide batch-oriented electronic funds transfer system.

Figure 18. Business Preferences for Payment Methods (Percent Yes)



In the survey, businesses were also able to prioritize their preferred methods of payment. Results indicate that electronic fund transfer is the most preferred option (42%), leading even the traditional check option (35%, see Figure 19). Credit card payment is ranked third (11%) and the option of charge accounts with the state government follows closely behind (8%). These percentages are consistent with the ranking of payment choices. Credit card payment through a third party is not considered a desirable option; less than 2% of businesses select this option.

Figure 19. The Most Preferred Payment Method for Online Transactions



The various industry types seem to follow a similar pattern in their ranking of preferred payment methods (with a few minor exceptions). Financial service businesses generally follow the

above pattern, for example, preferring electronic payment and checks as the two high-ranked choices. Such a trend also holds for the retail, services, construction, and manufacturing industries. In contrast, agricultural and wholesale businesses choose credit card payment as the most preferred option, over the use of check and electronic fund transfer. Transportation businesses prefer the traditional paper check over any other payment option.

Employment-size seems to impact payment method preferences. Smaller businesses tend to prefer traditional checks, more so than larger businesses. Nearly half of all businesses in the 1-4 employee-size group selected the traditional check payment as the most preferred method. For larger businesses in the 100 or more employment-size group, only 20% chose the traditional check payment as the most preferred method. Such large businesses (by a ratio of two-thirds) tend to prefer electronic fund transfer.

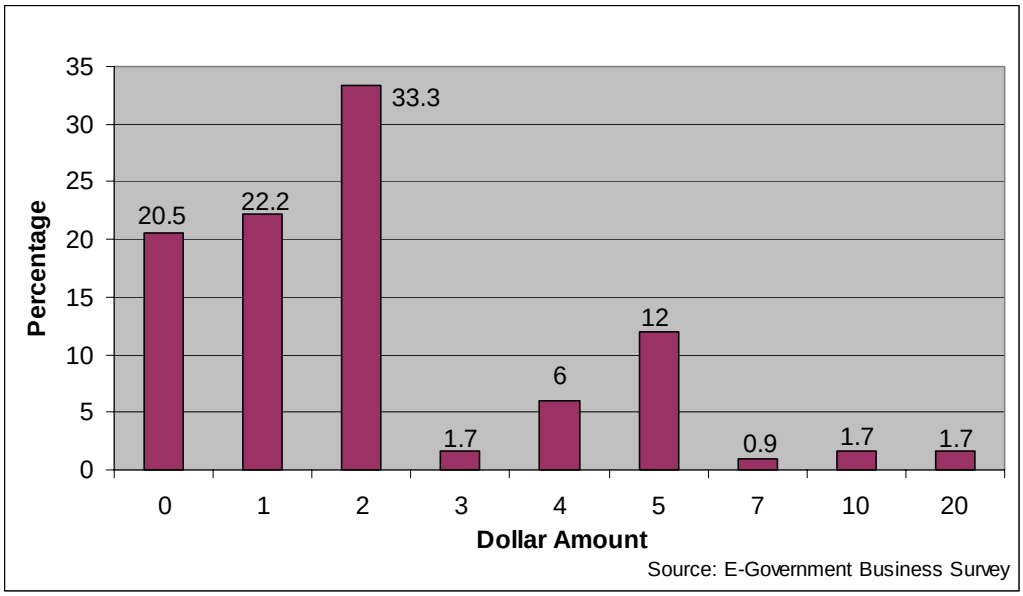
A vast majority of Iowa businesses would not want to pay a 1% surcharge for electronic fund transfer, credit card, or credit card payment through a third party. Out of 306 participating businesses, about 86% would not want to be charged an additional 1% of the service fee. A flat-fee option seems to have more support. When asked if they would be willing to pay $1 extra per transaction to cover the cost of online transactions using a state charge account, about 40% of Iowa businesses support such an idea. Therefore, it should be noted that a majority of businesses are still not willing to pay $1 per transaction for using a charge account. This indicates that a flat nominal fee would be more acceptable than a percentage charge (i.e., which is typical of credit card payment options). However, in general, Iowa businesses are not willing to pay for surcharges. On the other hand, a basic transaction fee seems to be more palatable for most businesses.

Willingness to Pay for Online Transactions

On average, Iowa businesses are generally willing to pay slightly more than $2 for each online transaction with state agencies. These businesses were presented with a set of questions to gauge their willingness to pay. They were first made aware that the full cost of conducting a transaction with state agencies offline may involve various costs such as travel expenses, travel time, waiting in line, postage costs, or mail delay. As a result, the total cost could range from $1 for postage to as much as $20 to $30 for a personal office visit. The survey then asked whether they would be willing to pay $2-$4 for the convenience of online transactions. Nearly 60% of these businesses would be willing to pay at least $2 per online transaction. The figure drops to 40% when asked whether businesses will pay $4 for each preferred transaction.

Businesses were then asked about the highest user fee they would be willing to pay. This question also gave businesses the opportunity to indicate a value of less than $2. About 20% do not want to pay anything, indicating a zero amount as the highest fee they would be wiling to pay for online transactions (Figure 20). Nevertheless, 22% are willing to pay a maximum of $1, whereas 33% are willing to pay a maximum of $2. A little over 20% of the businesses are willing to pay $4 or more. The highest amount that a business would consider paying is $20 for each transaction.

Figure 20. Maximum Fee Willing to Pay for Online Transaction (Open Question)



The variation among industry types in terms of the user fees that businesses are willing to pay is rather limited. On average, the relatively larger groups of industry-types such as retail, service, and financial service are willing to pay $2 to $2.50 maximum. This is comparable to the average maximum of $2.40 which the sample as a group is willing to pay. Wholesale and construction businesses have a lower average maximum user fee ($1.30 for both types). Transportation and agricultural businesses are willing to pay a higher maximum user fee, ranging from $4 to $5. However, since transportation and agriculture constitute a small proportion of the sample, it would be difficult to infer broadly based on these two industries. Also results may become slightly skewed when one or two participants are willing to pay up to $20 per transaction.

Large companies, measured by employment size, are not necessarily willing to pay more. There is no clear correlation between the business size and willingness to pay higher fees. Businesses in the 1-4 employee-size group are willing to pay on average up to $1.90 per transaction, which is slightly below the general average of $2.40. Next, businesses in the 5-9 employee-size group are willing to pay up to $3.50 on average, which is higher than the general average. Interestingly, businesses in the 10-19 employee-size group are willing to pay up to only $1.50 (a dollar amount lower than that of the 1-4 employee-size group). Finally, it should be noted that larger companies (20 or more employees) are generally much fewer in number so the study cannot arrive at a meaningful interpretation of the maximum amount they are willing to pay.

A vast majority of Iowa businesses, about 95%, is willing to forego any potential savings resulting from the cost difference between the second-least costly option and the online option. For example, assume that it costs a business 20 dollars to cover the cost of obtaining a permit in person, including staff time, gas, and application fees to apply for the permit. Further assume that it costs the same business only 10 dollars for staff time, Internet use, and application fee to apply for the permit online. We would expect that the business in question is willing to pay up to 10 dollars—the difference between the second least cost and online options—for the convenience of doing it online. The way to get at the maximum amount that they are willing to pay is to ask them whether they will be willing to obtain the service online if their company could break even on the transaction cost.

They were also asked if they would be willing to conduct the transaction online if it would save them 2 dollars in transaction cost. About 92 percent of businesses regard a minimum savings of 2 dollars as a favorable condition for them to obtain their desired information and services online. When approached to indicate whether a minimum savings of 4 dollars is important for them, 85 percent of businesses said yes.

This shows a strong preference for businesses to see some savings in conducting transactions online, but it is not necessary. The savings are put in the context of full transaction costs, including gas, traveling time, waiting in line, postage, or mail delay. This means businesses might not be discouraged by being charged a few dollars to conduct transactions online because traveling and waiting in line is likely to cost them more. Interestingly, savings are not really necessary. Over 95 percent of businesses are willing to conduct the transaction online if they can break even. This implies that businesses are willing to pay an online transaction fee less than or equal to the difference between the second least cost option and the online one. Thus, in light of this, the "willingness to pay" factor can be translated into a range of $5-$15, depending on the nature of the transaction.

Types of Online Services for Which Iowa Businesses Will Pay

Businesses were asked to reveal the maximum fee they would be willing to pay for specific services the firm had identified that they wished to conduct with the state online. Their demand for an online service is measured both by the desire for a service and a willingness to pay for that service. Getting permits is the number one transaction that Iowa businesses prefer to do online. This has the highest (on average) maximum fee amount of approximately $4 that these businesses are willing to pay for an online transaction. Examples of this transaction include getting construction permits and water permits. Specialized business information is the second highest desired service. Businesses are willing to pay up to $3 for it. Examples include finding specific Uniform Commercial Code (UCC) related information and searching for physicians. Contract bidding is another highly desirable service area, with businesses willing to pay (on average) a maximum of $3 for the online service.

Filing taxes online and doing licensing on state web sites follow closely behind, (on average) $2 for highest user fees that businesses are willing to pay. Examples of taxes mentioned include sales tax, payroll tax, and withholding taxes. Licensing includes contract licensing, professional licensing, and others. Seeking employee information and filing reports and claims constitute the group of transactions that businesses are willing to pay (on average) a maximum of $1.50. Employment-related information includes criminal history, unemployment information, and child support. Examples of transactions involving reports and claims are mostly unemployment reports, filing court paper, and chemical-related ones.

Conclusions and Recommendations

Iowa businesses are active participants in the Internet age. Survey results show that 84.5% of businesses are currently online. An additional 4%will connect to the internet by the end of 2005. This will bring the penetration rate close to 90%. A high penetration rate of broadband usage is another feature of Iowa businesses. Broadband access is available for every three of four Iowa businesses (76%) that are currently online. As expected, large businesses are more likely than smaller businesses to be online and are also more likely to be using broadband. The leading industry types that are online are relying less on high-speed connection; and this may be attributed to difference in business needs.

The prevalence of Internet connections, and more importantly, broadband access, places Iowa businesses in a good position to interact with state agencies online. In general, Internet access does not seem to be an issue for Iowa businesses. Therefore, the state government can place more emphasis on providing specific online services, rather than on ensuring universal access. Moreover, Iowa can gradually roll out high-performance online transactions targeted at broadband users. For the small percentage of businesses still not connected to the internet, the study suggests that lack of need is the main barrier, rather than cost. If the state were to offer more convenient and cost-efficient online transactions, these businesses would increasingly adopt Internet usage.

Iowa businesses see both benefits and costs when they consider conducting online transactions with the government. Businesses value the benefit of having up-to-date information most, and they value also the convenience of no-waiting time and the rapid speed of transactions. Offering online services on a 24/7 basis is not as critical, nor is the ability to conduct transactions from any location. This probably stems from the fact that most businesses have regular hours and a fixed business location.

Nevertheless, Iowa businesses also face barriers potentially preventing online transaction with the state government. Interestingly, for the majority of businesses, security and privacy are not the main barriers, and quality of information and unreliable internet access are the least of their worries. Rather, the most significant barrier is the lack of opportunity to ask questions. Difficulty in finding information and the lack of person-to-person contact are also concerns. Taken together, the analysis suggests that services created for business transactions should include options for initiating contact with the agency when online and help during normal business hours is needed.

The prioritized list of benefits and barriers will help the state government plan strategies for maximizing return while providing online government services. The priority items are better content manageability and usability. Proper content management helps to ensure information is up-to-date and accurate. Iowa businesses should be consulted when designing web sites. Businesses can provide guidance on drafting frequently-asked-questions and designing user-centered navigation schemes. If successful, state websites will minimize the need for businesses to ask questions and businesses will find it easier to access information. The state needs to concentrate its effort in transferring more business transactions online while reengineering inefficient business processes. As a result, Iowa businesses would be able to continue to enjoy the benefits of no-waiting periods and rapid transactions.

Iowa businesses seem to have a high degree of trust in the state government, as can be seen in the low-level importance they assigned to concerns about security, privacy, and unreliable connections. Therefore, a significant opportunity has opened up for e-government services. Currently, across various transaction types that businesses conduct with government, an average of only 30% of these transactions are being conducted online. About 80% of businesses that currently

are not conducting transactions online say they would like to do so in the future. This means that the state can initiate outreach to over half of Iowa's businesses while cementing its relationship with the 30% which it already is serving online. This magnitude of demand holds across a broad range of possible online transactions, from permit application and renewal to employee history research.

The State of Iowa can realize the full potential of information technology to deliver value to the majority of Iowa businesses that express interests and have the access to transact with government online. The State of Iowa should actively pursue those opportunities by offering businesses the services they need. This study recommends an overall strategy with four interrelated components. First, the state can take an enterprise approach in developing engines and modules such as payment engine and access management that can be used in various business transactions. This is to economize on development costs. Second, the state needs to provide online payment methods and design a fee structure that will help increase adoption rates to achieve economies of scale. Third, the state needs to offer functionalities such as more online forms and e-mail confirmation as desired by Iowa businesses as enhancements.

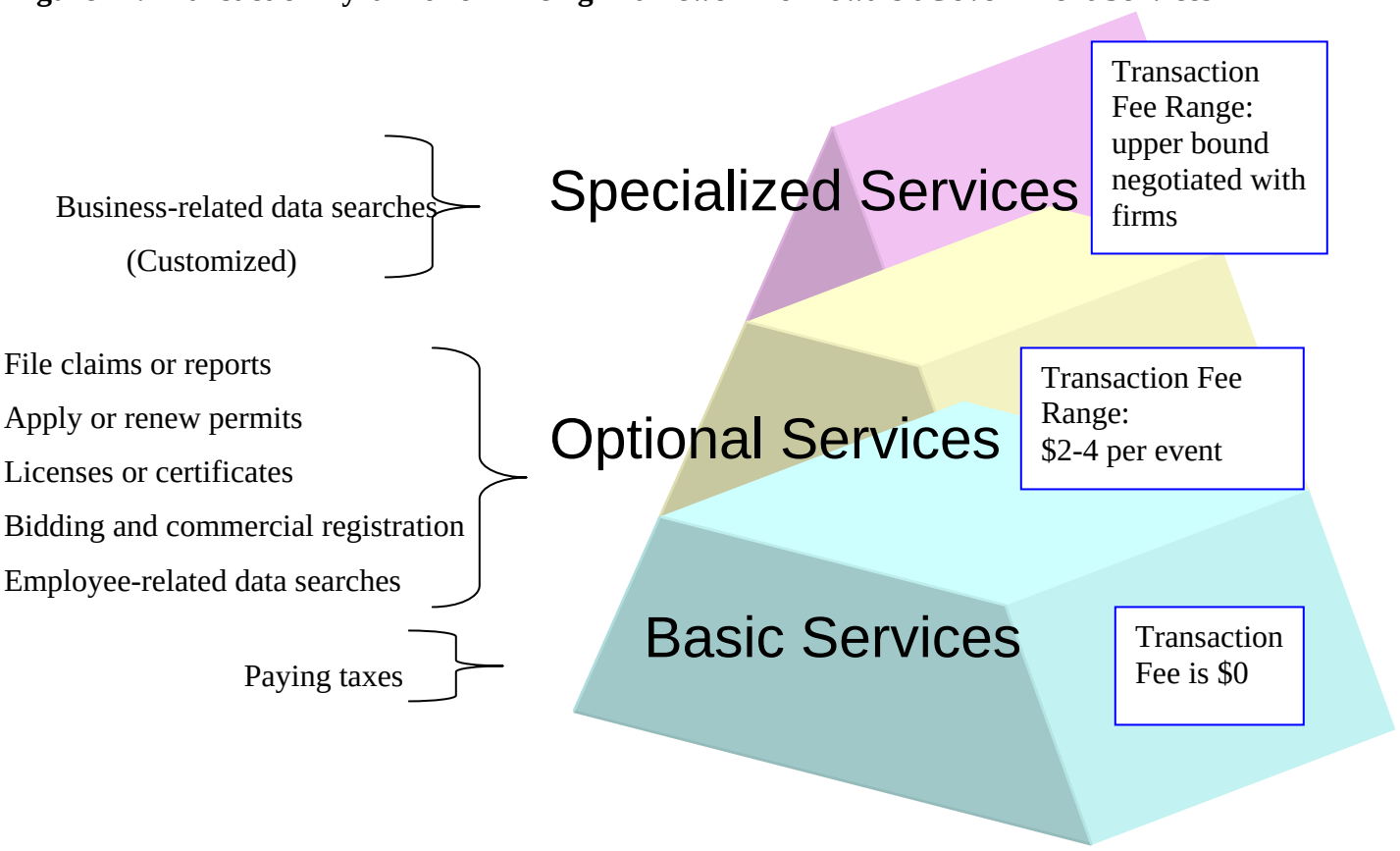
The fourth component relates to financing the development and maintenance of online transactions capacity in state agencies. Iowa businesses are equally split in the use of user fees or tax dollars to finance e-government projects. A similar pattern follows the use of a nominal fee without specifying a dollar amount. Since these questions are about their general opinion, there is no clear indication from businesses which one is the preferred approach. The responses of businesses are likely to vary depending on the specifics of a proposed service. State agencies need to look into the specifics and probably conduct a full-cost accounting to fully understand the cost involved. Moreover, they need to look at the number of businesses and the extent to which they will benefit from the services-while considering public policy implications.

Electronic fund transfers, including ACH, e-checks, etc, and traditional paper check options, are payment methods preferred by Iowa businesses transacting with state government. When given the option of choosing more than one method, a credit card and a charge account with the state are closely behind the top two choices. However, credit cards and charge accounts render as insignificant options when businesses can only pick one option. This indicates that various forms of electronic fund transfer and traditional paper check are still the two most popular payment methods. These two have the demand from three-quarters of Iowa's businesses.

State government needs to take note of the popular demand of electronic fund transfer as a way for businesses to pay for their transactions with government. A substantial majority of businesses would like to see EFT as an option. In the meantime, state government still needs to make the traditional check payment option available since most businesses still would like to have that option. Currently, credit cards and charge accounts are not a priority for Iowa businesses. State government needs to weigh the costs and benefits of these two options carefully before applying them to various service transactions. It is particularly so when 20 percent of Iowa businesses are unwilling to pay even an additional dollar or one percent to have the credit card or charge account option available.

Below we return to the Transactions Pyramid, comparing the survey results with the pricing framework suggested in the pyramid. Figure 21 presents a modified version of the transaction pyramid, taking into account the willingness of Iowa businesses to pay for online transactions. The revised pyramid suggests that a basic service such as filing taxes online should not incur a transaction fee. Instead, developing and maintaining such basic services should be supported with general tax dollars.

Figure 21. Transaction Pyramid for Pricing Framework for Iowa's *e*Government Services



Optional online services, such as online claims and report filing, are amenable to a transaction fee in the range of $2 to $4. These fees can cover the development and maintenance of these online services. Iowa businesses are in support of paying approximately $2 (on average) for the convenience of conducting important state government transactions online. The businesses participating in the survey were made aware of the full potential costs incurred in traditional offline transactions (e.g., gas expense, travel time usage, postage costs, mail delays, etc.). In light of this, Iowa businesses seem willing to pay a little more for convenience and possible savings gained from switching to online transactions. Processing permits and conducting specialized business information research are the top two services for which businesses are willing to pay. Filing taxes online and processing licenses follow closely behind.

The willingness of a business to pay a fee represents a potential economic gain resulting from making e-government services available. At the minimum, Iowa businesses see the value of on average $2 per transaction to make services available online. State agencies need to consider this amount in their charge scheme for offering services online. This consideration should be placed in a context of providing cheaper and faster services for Iowa businesses. In terms of priority service areas as indicated by the value placed by businesses, state government should put more permit applications and approvals online as well as develop databases to offer specialized information services for businesses.

Moreover, the survey results suggest that, to cover a particular payment, businesses prefer a charge that is a generic transaction fee rather than a surcharge. Businesses are willing to pay for convenience, but they resist obvious surcharges to cover credit card processing or other types of payment processing. In the private sector, such charges are incorporated into the cost structure of the pricing framework. The survey results suggest that state agencies should follow this practice. To the extent that allowing payment by ETF systems is possible, the costs of this payment method should be incorporated into the transaction fee structure for a particular service or agency.

Although Figure 21 suggests an average fee range of $2-$4, the survey results indicate that businesses have a strong preference for savings gained from online transactions. Therefore, the willingness to pay may be as high as the $5-$15 range, depending upon the nature of each particular transaction. A high demand for direct contact with agency staff during normal business hours may require higher fees. In any case, the survey data suggest that many businesses will pay for better service.

Finally, it should be noted that the specialized services at the top of the pyramid do not represent common transactions. These services may involve highly customized business data searches requiring specialized staff work in programming and related tasks. The capacity to deliver these kinds of services for a relatively few businesses will likely result in a high unit cost. Thus, the transaction fee is best negotiated on an individual basis. Using the survey data, we are unable to identify any specific transactions directly pertaining to this category. However, we expect that such demands exist (e.g., GIS data requests).

This study represents an initial step in a complex process of addressing the questions and concerns linked with developing e-government potential. It focuses on anticipating demand and assessing financing strategies. This report offers research data that can be used in the design and development of e-government services. The data can also be used to assist in the formulation of information technology policies targeting Iowa businesses. The study results are clearly important, though they should not be seen in isolation, nor should they be viewed as the single information source in the planning of service provisions and making of public policy. Other critical factors that must be considered in tandem include the public nature of certain services, existing financing systems, and long-term development plans of e-government capability.

Appendix A: Methodology

The current phase of the project began in August 2004 and ended in April 2005. We began with a literature review and an annotated bibliography of research on electronic governments with specific references to e-commerce functions and payment options. We conducted a comprehensive review of forty-six Iowa state government web sites. We wanted to offer in the survey a realistic list of electronic government services already currently being offered to Iowa businesses. Moreover, we identified approximately 149,000 Iowa businesses by using the 2004-2005 edition of DirectoriesUSA's Iowa Business Directory, a comprehensive database of Iowa businesses.

More intensive survey development began in mid-September and lasted through late October. During this process, a subcommittee of the IOWAccess Advisory Council was formed, incorporating members David Redlawsk (University of Iowa), Mary Maloney (Polk County Treasurer) and Mariam Ubben (President, SITIworks). The subcommittee participated in conference calls with the researchers, monitored monthly project reports, and provided guidance on the project direction as well as the content of the business survey instrument.

We collaborated with Iowa State University's Center for Survey Statistics and Methodology to develop a telephone questionnaire for the survey. Pilot interviews were conducted with six local business representatives to help identify troublesome items. Adjustments were made to the questionnaires. The questionnaire was programmed and tested for accuracy by the survey center's staff.

When the final survey had been programmed, the survey center launched the telephone survey in mid-November. Because of the holiday season, the survey was extended into the first two weeks of January 2005, with the approval of the subcommittee. A total of 800 telephone calls were made, resulting in 432 completed telephone surveys. The final dataset was delivered to the researchers in mid-February. Data analysis and report writing spanned from March to April 2005.

Sample Design

The survey sample was selected from DirectoriesUSA's Directory of Iowa businesses (2004-2005 edition), which had been purchased by the principal investigators. The directory listed information for 149,000 businesses in the state of Iowa and the survey center randomly selected 1,500 businesses from the directory to produce a sample stratified by industry type (SIC) and employee number. Staff from the Center checked the file of 1,500 businesses for duplicate listings and then sorted the file by Standard Industrial Classification (SIC) code groups (SIC_Group_Code) and by number of employees (Employ) before selecting a proportional sample of 800 businesses to use for research. The sample included non-profit organizations as well as for-profit businesses, since both types of establishments have contact with state offices and agencies. In some cases, the sample also included multiple locations for the same business. We decided to gather information at a single time for the business as a whole, then record secondary locations as ineligible.

Data Collection

The center was responsible for recruitment, training, and supervision of telephone interviewers; telephone interviewers were trained in computer-assisted telephone interviewing (CATI) techniques. A manual with interviewing procedures and question-by-question specifications was used both for training and for reference throughout the interviewing process. Project training was held on November 10, 2004 and data collection took place from November 15, 2004 through January 14, 2005.

Letters were sent in advance to businesses identified in the sample, explaining the project and informing the businesses that a project interviewer would try to contact them shortly. These

letters were addressed to the contact person listed in the sample file, although any knowledgeable person at the business would be eligible for interviewing. Attempts were made to contact all businesses in the sample. Phone numbers with no personal contact were checked to verify accuracy and then were rotated through a minimum of 12 call attempts at various times. Disconnected phone numbers were verified and attempts were made to locate working numbers.

Standard interviewing protocols were followed by survey center staff throughout the project. All interviewing was done in the center's computer lab under the supervision of project staff. The interviews were 15 to 20 minutes in length. Interviewers were monitored at random intervals by quality-control staff to ensure proper procedures and to provide feedback on interviewing techniques. CATI software was programmed to include edit checks, to detect illegal values and logic errors as responses were being entered into the computer during the interview. Data retrieval callbacks were made to the respondent by the original interviewer or supervisor when required. Basic frequencies and cross tabulations were analyzed to catch entry or coding errors, and corrections were made as needed.

Table A1 represents the survey sample and shows the results of the center's attempts to interview the 800 sampled cases. Approximately 6% of the sampled businesses were ineligible either because they had ceased conducting business, or were erroneously listed in duplicate, or were simply not businesses at all. About 4% of the businesses could not be located; these businesses may have ceased conducting business or their status could not be verified. Four of the sampled businesses responded with only a fax upon each call attempt. Subsequent attempts to locate alternative telephone numbers were unsuccessful and the status of the business could not be verified.

The refusal rate was 23%. About 15% of the eligible sample received a maximum number of call attempts before being finalized. Interviews were completed with 432 businesses, for an overall response rate of 57%.

Table A1: A Breakdown of Sampled Businesses

	Total	**%**
Total Sample	800	
Ineligible	45	5.5% of 800
Eligible Sample	755	
Can not be located	33	4.4% of 755
Maximum Calls	112	14.8% of 755
Fax only	4	0.5% of 755
Refused	174	23.0% of 755
Completed Interviews	432	57.2% of 755

Reported sample percentages are statistically valid within ± 5% at the 95% confidence level. Therefore, if 54% of the respondents answer a certain question affirmatively, the true percentage in the overall sampled population has a 95% chance of being in the range of 49% and 59%.

Appendix B: Iowa Businesses: A Historical Perspective

Business counts by SIC category have remained primarily stable over the past six years. There has been almost no change over the past two years. Agriculture maintains an approximate 3% share of total number of businesses. Construction, manufacturing, and transportation businesses hold steady positions at approximately 7%, 5%, and 4%, respectively. For the same six year period, financial service businesses made up approximately 9% of Iowa businesses. Of the eight industry types identified, wholesale, retail and service businesses were the only three which have seen changes over the six-year period. Service businesses grew from 35.3% to 47%. Retail businesses declined, falling from 29% to 19%.

Moreover, business counts for employee-size have remained stable over the past six years, showing a slight increase in the 1-4 employee-size group (62.9% to 63%), and an increase in the 100 and over employee-size group (1.6% to 2%).

Table B1: Business Counts by SIC Category

	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Agriculture	2.4%	2.4%	2.4%	2.4%	3%	3%
Construction	7.4%	7.4%	7.4%	7.4%	7%	7%
Manufacturing	5.6%	5.6%	5.6%	5.6%	5%	5%
Transportation	3.8%	3.8%	3.8%	3.8%	4%	4%
Wholesale	10.0%	10.0%	10.0%	10.0%	7%	6%
Retail	26.0%	26.0%	26.0%	26.0%	19%	19%
Financial Services	8.9%	8.9%	8.9%	8.9%	9%	9%
Services	35.3%	35.3%	35.3%	35.3%	46%	47%

Table B2: Business Counts by Employment Category

	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
100+	1.6%	1.6%	1.6%	1.6%	2%	2%
50 to 99	2.1%	2.1%	2.1%	2.1%	2%	2%
20 to 49	6.2%	6.2%	6.2%	6.2%	6%	7%
10 to 19	9.2%	9.2%	9.2%	9.2%	9%	9%
5 to 9	18.0%	18.0%	18.0%	18.0%	17%	17%
1 to 4	62.9%	62.9%	62.9%	62.9%	64%	63%

Appendix C: Complete Descriptive Statistics for Figure 10 & 13

Table C1. Descriptive Statistics for Figure 10: Satisfaction with Online Business Services from Iowa Agencies, by Type.

	No.	Median	Mode	Mean	Std. Deviation
Satisfaction with (licenses or certificates) online	41	5	5	4.37	0.94
Satisfaction with (apply or renew permits) online	48	5	5	4.5	0.68
Satisfaction with (business search) online	45	4	4	4.04	0.82
Satisfaction with (employee related) online	55	4	5	4.2	0.89
Satisfaction with (bidding and commercial regulation online)	17	4	4	4.06	0.97
Satisfaction with (file claims or reports) online	45	4	4	4.29	0.59

Table C2. Descriptive Statistics for Figure 13, Scores for Benefits of Transacting Online with State Government.

	No.	Median	Mode	Mean	Std. Deviation
Convenience of 24/7 service	365	3	5	3.18	1.41
Convenience of doing transaction from any location	365	3	5	3.07	1.50
Convenience of no waiting	365	4	5	3.97	1.24
Convenience of speed of online transactions	365	4	5	3.95	1.22
Convenience of having up-to-date information	364	5	5	4.36	1.04

Appendix D: Distribution of Unmet Demand for Online Transactions, by SIC, Service Type

Table D1. Distribution of Unmet Demand for Online Transactions, by SIC, Service Type

Online Potential Demand to(for):		SIC Group Agric.	Const	Fincl Serv	Manfg	Retail	Serv	Transp	Whole sale	Total
File claims or reports		8	12	25	13	57	106	9	16	
	Row %	*3%*	*5%*	*10%*	*5%*	*23%*	*43%*	*4%*	*7%*	100%
Apply or renew permits		8	10	11	12	61	70	10	14	
	Row %	*4%*	*5%*	*6%*	*6%*	*31%*	*36%*	*5%*	*7%*	100%
Apply or renew licenses or certificates		7	9	21	11	33	91	6	8	
	Row %	*4%*	*5%*	*11%*	*6%*	*18%*	*49%*	*3%*	*4%*	100%
Bidding and commercial registrations		6	9	8	12	29	41	7	13	
	Row %	*5%*	*7%*	*6%*	*10%*	*23%*	*33%*	*6%*	*10%*	100%
Employee-related searches		1	2	4	2	7	30	2	5	
	Row %	*2%*	*4%*	*8%*	*4%*	*13%*	*57%*	*4%*	*9%*	100%
Business-related searches		2	2	5	3	7	13	3	0	
	Row %	*6%*	*6%*	*14%*	*9%*	*20%*	*37%*	*9%*	*0%*	100%

Table D1 complements Table 4 in the report. Table D1 presents data on unmet demand for online transactions in a slightly different way. It illustrates the distribution of the unmet demand for specific service types by SIC category. The row percentage is the proportion of unmet demand for a particular service relevant for a particular industry type (SIC). For example, manufacturing businesses account for 5% of the unmet demand for filing claims or reports online, whereas service businesses represent 43% of this unmet demand. Similarly, 10 percent of the unmet demand for bidding and commercial registrations online is generated by manufacturing compared to 33 percent generated by the services sector.

Table D1 thus provides more specific guidance for agencies about which types of transactions are appropriate for development, given the industry for which the agency has responsibility. For example, the manufacturing sector accounts for six percent of the license and permitting transactions, but for none of the licensing or permitting transactions online (see Table 4 in report text). Similarly, the transportation sector accounts for six percent of the bidding transactions, but for none of the bidding transactions online. The IowAccess Council should give priority to agency applications that propose to develop online transactions for which there is a deficit with respect to the degree of online transactions for a specific service and industry.